

77  
GENERAL LIBRARY

NOV 7 1918

NOV 5 1918

UNIV. OF MICH.

53-10

**Proceedings of the American Academy of Arts and Sciences.**

VOL. 53. No. 10. — SEPTEMBER, 1918.

---

RECORDS OF MEETINGS, 1917-18.

BIOGRAPHICAL NOTICES.

OFFICERS AND COMMITTEES FOR 1917-18.

LIST OF THE FELLOWS AND FOREIGN HONORARY  
MEMBERS.

STATUTES AND STANDING VOTES.

RUMFORD PREMIUM.

INDEX.

(TITLE PAGE AND TABLE OF CONTENTS.)

(Continued from page 3 of cover.)

## VOLUME 53.

1. COLLINS, FRANK S., AND HERVEY, ALPHEUS B.—The Algae of Bermuda. pp. 1-195. 6 pls. August, 1917. \$1.75.
2. REIDER, ALFRED.—The Genus *Fraxinus* in New Mexico and Arizona. pp. 197-212. October, 1917. 25c.
3. WHEELER, WILLIAM MORTON.—The Australian Ants of the Ponerine Tribe *Cerapachyini*. pp. 213-265. January, 1918. 80c.
4. BRIDGMAN, P. W.—Thermo-electromotive Force, Peltier Heat, and Thomson Heat under Pressure. pp. 267-386. March, 1918. \$1.75.
5. MOORE, C. L. E., AND PHILLIPS, H. B.—The Dyadics which occur in a Point Space of Three Dimensions. pp. 387-438. March, 1918. \$1.00.
6. SHIMER, HERVEY W.—Post-glacial History of Boston. pp. 439-463. May, 1918. 50c.
7. DAVIS, ANDREW McF.—Ancient Chinese Paper Money as Described in a Chinese Work on Numismatics. pp. 465-647. June, 1918. \$1.50.
8. MOORE, C. L. E.—Rotations in Hyperspace. pp. 649-694. July, 1918. \$1.00.
9. THAXTER, ROLAND.—Extra-American Dipterophilous Laboulbeniales. pp. 695-749. July, 1918. 80c.
10. Records of Meetings; Officers and Committees; List of Fellows and Foreign Honorary Members; Statutes and Standing Votes, etc. September, 1918. \$1.00.







**Proceedings of the American Academy of Arts and Sciences.**

**VOL. 53. No. 10.—SEPTEMBER, 1918.**

---

RECORDS OF MEETINGS, 1917-18.

BIOGRAPHICAL NOTICES.

OFFICERS AND COMMITTEES FOR 1917-18.

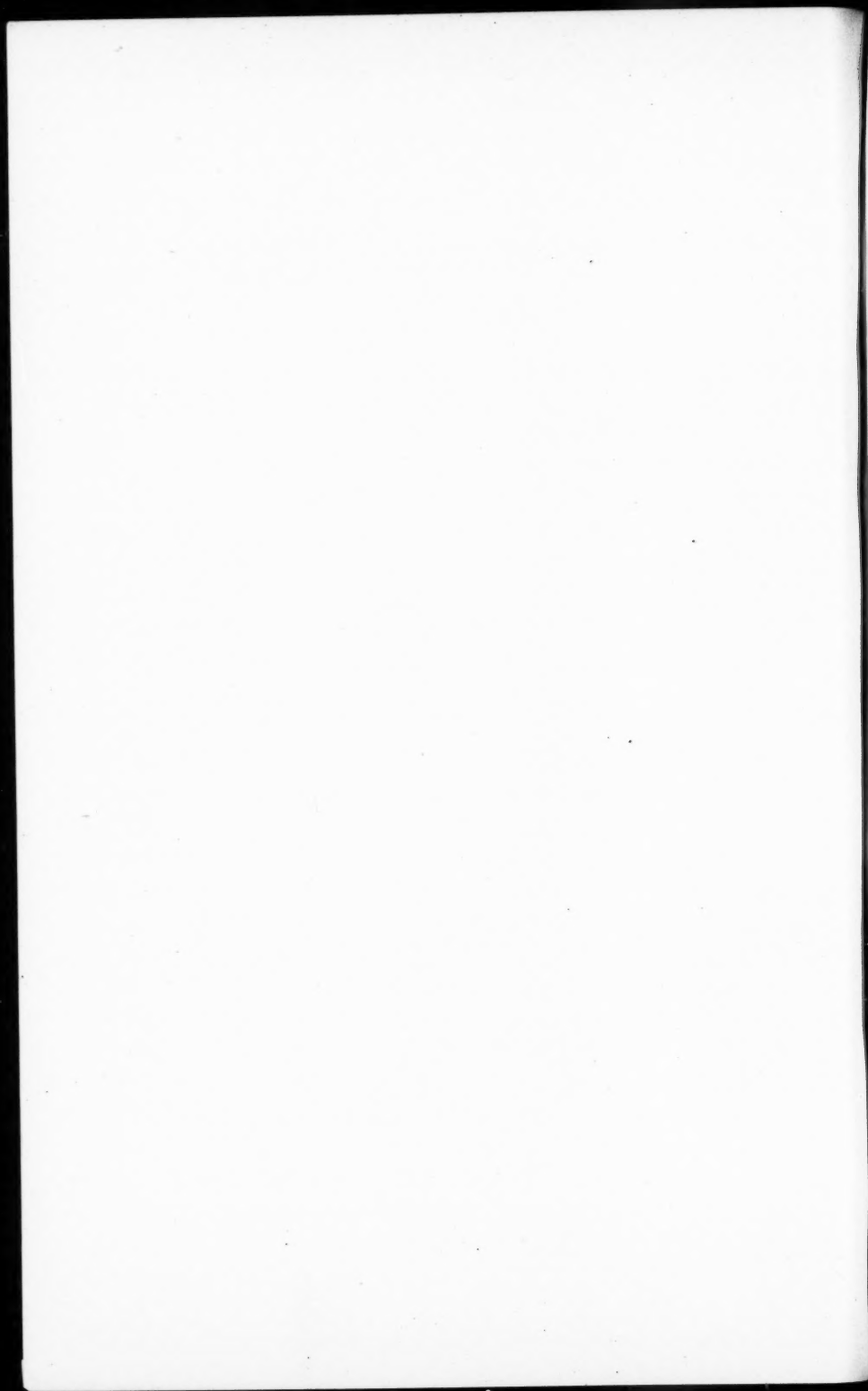
LIST OF THE FELLOWS AND FOREIGN HONORARY  
MEMBERS.

STATUTES AND STANDING VOTES.

RUMFORD PREMIUM.

INDEX.

(TITLE PAGE AND TABLE OF CONTENTS.)



## RECORDS OF MEETINGS.

---

One thousand and sixty-sixth Meeting.

OCTOBER 10, 1917.—STATED MEETING.

The Academy met at its House.

The PRESIDENT in the Chair.

There were seventy-three Fellows present.

The following letters were presented by the Corresponding Secretary:—from R. C. Archibald, B. A. Behrend, C. F. Brush, E. W. Burlingame, R. A. Cram, E. W. Emerson, H. H. Furness, C. N. Greenough, H. E. Gregory, F. B. Gummere, J. C. Hoppin, W. G. Howard, G. F. Hull, F. J. Foakes Jackson, C. W. Johnson, F. B. Loomis, Arthur Lord, R. S. Lull, Allan Marquand, Alexander McAdie, W. J. Miller, Frank Morley, C. E. Park, L. V. Pirsson, P. E. Raymond, W. N. Rice, Frederick Slocum, R. C. Sturgis, J. B. Watson, John Zeleny, accepting Fellowship; from F. D. Adams, Tullio Levi-Civita, R. M. Pidal, accepting Foreign Honorary Membership; from E. D. White, declining Fellowship.

The Chair announced the deaths of the following Fellows: John Williams White, Class III., Section 2; Joseph Hodges Choate, Class III., Section 1; Bela Lyon Pratt, Class III., Section 3; James Mason Crafts, Class I., Section 3; Herbert Langford Warren, Class III., Section 4; William DeWitt Hyde, Class III., Section 1; William Bullock Clark, Class II., Section 3.

A biographical notice of E. H. Strobel, by Samuel Williston was presented by the Corresponding Secretary.

On recommendation of the Council, it was

Voted, To appropriate two hundred (\$200) dollars to be expended at the discretion of the President.

The following Communication was presented: Dr. James J. Putnam, "A General View of the Psychoanalytic Movement."

The following paper was presented by title: "The Post-glacial History of Boston," by H. W. Shimer.

The meeting then adjourned.

**One thousand and sixty-seventh Meeting.**

**NOVEMBER 14, 1917.—STATED MEETING.**

The Academy met at its House.

The PRESIDENT in the Chair.

There were eighty-two Fellows and many guests present:

The Chair announced the death of George Vasmer Leverett, Fellow in Class III., Section 1.

The following Communication was presented: Senator Henry Cabot Lodge, "War Legislation."

The meeting then adjourned.

**One thousand and sixty-eighth Meeting.**

**DECEMBER 12, 1917.—STATED MEETING.**

The Academy met at its House.

The PRESIDENT in the Chair.

There were forty-five Fellows present.

A letter was presented from the University of California inviting the Academy to send a delegate to its fiftieth anniversary, March, 1918.

The chair announced the death of Gaston Camille Charles Maspero, Foreign Honorary Member in Class III., Section 2.

The following votes of the Council were presented: 1. To refer the invitation of the University of California to the President with power. 2. That in the opinion of the Council it is inexpedient that ladies should be invited to meetings of the Academy unless by vote of the Academy or the Council for particular meetings. 3. That at his discretion the Treasurer be authorized, on request, to remit the dues of any Fellow called from the Commonwealth for service in the present war, for the term of his absence.

The following Communications were presented:

Professor G. F. Moore, "The Properties of Numbers and the Doctrine of Ideas."

Professor H. W. Shimer, "The Post-Glacial History of Boston."

Professor A. E. Kennelly, "The Speeds, Powers, and Fatigue of Racing Animals," illustrated by lantern.

The following papers were presented by title:

"On Dyadics Occurring in Point Space of Three Dimensions," by C. L. E. Moore and H. B. Phillips.

"A Table of the Legendre Functions of the Second Kind  $Q_1(x)$  and  $Q'_1(x)$  by Willard J. Fisher, presented by A. G. Webster.

The meeting then adjourned.

One thousand and sixty-ninth Meeting.

JANUARY 9, 1918.—STATED MEETING.

The Academy met at its House.

The PRESIDENT in the Chair.

There were forty-seven Fellows present.

In the absence of the Recording Secretary, the Corresponding Secretary was appointed Recording Secretary *pro tem*.

A biographical notice of De Amicis by W. R. Thayer was presented by the Corresponding Secretary.

Suggestions from E. B. Wilson regarding amendments of the Statutes were referred to a committee consisting of E. B. Wilson, H. W. Tyler and E. V. Huntington.

The following gentlemen were elected Fellows of the Academy:

Grinnell Jones, of Cambridge, to be a Fellow in Class I., Section 3 (Chemistry).

Irving Langmuir, of Schenectady, to be a Fellow in Class I., Section 3 (Chemistry).

William Ebenezer Ford, of New Haven, to be a Fellow in Class II., Section 1 (Geology, Mineralogy and Physics of the Globe).

William Crawford Gorgas, of Washington, to be a Fellow in Class II., Section 4 (Medicine and Surgery).

Robert Battey Greenough, of Boston, to be a Fellow in Class II., Section 4 (Medicine and Surgery).

Henry Jackson, of Boston, to be a Fellow in Class II., Section 4 (Medicine and Surgery).

Thomas Willing Balch, of Philadelphia, to be a Fellow in Class III., Section 1 (Theology, Philosophy and Jurisprudence).

Willard Bartlett, of Brooklyn, to be a Fellow in Class III., Section 1 (Theology, Philosophy and Jurisprudence).

Charles Warren Clifford, of New Bedford, to be a Fellow in Class III., Section 1 (Theology, Philosophy and Jurisprudence).

Charles Evans Hughes, of New York, to be a Fellow in Class III., Section 1 (Theology, Philosophy and Jurisprudence).

James Madison Morton, of Fall River, to be a Fellow in Class III., Section 1 (Theology, Philosophy and Jurisprudence).

George Burton Adams, of New Haven, to be a Fellow in Class III., Section 3 (Political Economy and History).

Charles McLean Andrews of New Haven, to be a Fellow in Class III., Section 3 (Political Economy and History).

Evarts Boutell Greene, of Champaign, Ill., to be a Fellow in Class III., Section 3 (Political Economy and History).

William MacDonald, of Berkeley, Cal., to be a Fellow in Class III., Section 3 (Political Economy and History).

Harold Murdock, of Brookline, to be a Fellow in Class III., Section 4 (Literature and the Fine Arts).

The following gentlemen were elected Foreign Honorary Members:

William Napier Shaw, of London, Eng., to be a Foreign Honorary Member in Class II., Section 1 (Geology, Mineralogy and Physics of the Globe).

Thomas Barlow, of London, Eng., to be a Foreign Honorary Member in Class II., Section 4 (Medicine and Surgery).

Francis John Shepherd, of Montreal, Canada, to be a Foreign Honorary Member in Class II., Section 4 (Medicine and Surgery).

Charles Scott Sherrington, of Oxford, Eng., to be a Foreign Honorary Member in Class II., Section 4 (Medicine and Surgery).

The following Communications were presented:

Judge Robert Grant, "Ancestors and Posterity."

Professor L. C. Graton, "A Geological Study of Copper Ores supported by American Mining Companies."

Professor M. L. Fernald, "Some Living Remnants of Ancient Floras on the Coast of New England."



The following paper was presented by title:  
"Ballistic Experiments by means of the Electrometer," by A.  
G. Webster and Mildred Allen.  
The meeting then adjourned.

One thousand and seventieth Meeting.

FEBRUARY 13, 1918.—STATED MEETING.

The Academy met at its House.

The PRESIDENT in the Chair.

There were forty-one Fellows, one Foreign Honorary Member, and two guests present.

The following letters were presented by the Corresponding Secretary: from G. B. Adams, C. McL. Andrews, T. W. Balch, Willard Bartlett, C. W. Clifford, W. E. Ford, E. B. Greene, R. B. Greenough, C. E. Hughes, Henry Jackson, Grinnell Jones, Irving Langmuir, J. M. Morton, Harold Murdock, accepting Fellowship; from F. J. Shepherd, accepting Foreign Honorary Membership; from J. H. Wright, resigning Fellowship; from the Historical Society of Florence, announcing the death of Pasquale Villari.

The Chair announced the following deaths: Paul S. Yendell, Fellow in Class I., Section 1; Charles E. Faxon, Fellow in Class II., Section 2; Pasquale Villari, of Florence, Foreign Honorary Members in Class III., Section 3.

The appointment of Professor Arthur A. Noyes as delegate to represent the Academy at the semi-centennial of the University of California, March 18-23 was announced.

The Council announced the receipt of biographical notices as follows: Cyrus Ballou Comstock, and Benjamin Baker, by G. F. Swain; Charles Francis Adams, by W. C. Ford; Thomas Raynesford Lounsbury, by Barrett Wendell.

The following Communications were presented:

Dr. S. B. Wolbach, "Studies on the Etiology of Rocky Mountain Spotted Fever."

Dr. H. A. Christian, "The String Galvanometer in the Study of Heart Disease."

Dr. H. C. Ernst. "An Old and New Microscope."

The meeting then adjourned.

## One thousand and seventy-first Meeting.

MARCH 13, 1918.—STATED MEETING.

The Academy met at its House.

The PRESIDENT in the Chair.

There were thirty-five Fellows and one guest present.

The following letters were presented by the Corresponding Secretary:— from Sir Thomas Barlow, W. N. Shaw, and C. S. Sherrington, accepting Foreign Honorary Membership; from O. K. O. Folin, resigning Fellowship; from the Kansas Academy of Science, inviting a delegate from the Academy to attend its semi-centennial anniversary at Lawrence, March 15 and 16, 1918.

A biographical notice of William Sellers by F. R. Hutton was presented.

The Chair announced the appointment of W. W. Campbell, to represent the Academy at the semi-centennial of the University of California, in place of A. A. Noyes, who was unable to attend.

It was also announced that an invitation to attend the meeting of the Academy had been extended to the Archbishop of York, who replied that owing to his departure from the city, he was unable to accept.

On motion of A. C. Lane, it was

Voted, That the following request be sent to the United States Fuel Administration.

"We the undersigned respectfully request the United States Fuel Administration, that if it fixes prices for coal at the mine and to the consumer, it give a heating value, to be determined, if required, by analysis or calorimeter test, which within reasonable limits of variation, such coal shall have; that deductions from, or additions to these prices be permitted for coal that proves by test to be of substantially different heating value; and since extra heating value is worth nearly as much at the mine as at the point of consumption (costing no more for freight, storage, and handling) buyers should be allowed to pay the mines for the extra heating value they may wish in proportion to the amount the coal is worth at the point at which it is to be consumed. This would have the public advantage that it would lead the mines to ship the most

concentrated fuel to the farthest points, and thus relieve the transportation system of the burden of carrying useless slate."

The Librarian read a letter of thanks from the Committee on the Union List of Periodicals, for further assistance from the Academy.

The Chair appointed the following Councillors to act as Nominating Committee:

Frederick S. Woods, of Class I.

Alfred C. Lane, of Class II.

Samuel Williston, of Class III.

On recommendation of the Council, the following appropriations were made for the ensuing year: —

From the income of the General Fund, \$5800, to be used as follows: —

for General and Meeting expenses	\$ 300.
for Library expenses	2500.
for House expenses	2000.
for Treasurer's office	800.
for President's expenses	200.

From the income of the Publication Fund, \$3500, to be used for publication.

From the income of the Rumford Fund, \$2945.76 to be used as follows: —

for Research	\$1000.
for Books, periodicals and binding	200.
for Publication	600.
for use at the discretion of the Committee	1145.76

\$250 was transferred from the unexpended balance of the current appropriation for "Publications" to "Research" for the coming year.

From the income of the C. M. Warren Fund, \$800, to be used at the discretion of the Committee.

The following communications were presented:

Prof. E. C. Jeffrey, "On the Origin of Rubber."

Prof. Waldemar Lindgren, "Some Geological Observations along the West Coast of South America."

The meeting then adjourned.

## One thousand and seventy-second Meeting.

APRIL 10, 1918.—STATED MEETING.

The Academy met at its House.

The PRESIDENT in the Chair.

There were thirty-one Fellows and one guest present.

A letter was presented by the Corresponding Secretary from William MacDonald, accepting Fellowship.

The Committee to which the proposed Amendments to the Statutes were referred recommended the following changes:—

Chapter II., Article 4, to read as follows:—

“If any person, after being notified of his election as Fellow or Resident Associate shall neglect for six months to accept in writing, or, if a Fellow or resident within fifty miles of Boston shall neglect to pay his Admission Fee, his election shall be void; and if any Fellow resident within fifty miles of Boston or any Resident Associate shall neglect to pay his Annual Dues for six months after they are due, provided his attention shall have been called to this Article of the Statutes in the meantime, he shall cease to be a Fellow or Resident Associate respectively; but the Council may suspend the provisions of this Article for a reasonable time.”

Paragraph 2, line 8. After the word “Fellows” insert “or Resident Associates”.

Article 5, line 1. After the word “Fellow” insert “resident within fifty miles of Boston”.

Line 6, Omit “except in the case of Fellows elected at the January meetings, who shall be obliged to pay but one half of such Annual Dues in the year in which they are elected.”

Line 8. After the word “Fellow” insert “or Resident Associate”.

Article 7, line 3. Omit “all the Fellows and”.

Line 4. Add “and to Fellows on request”.

Article 8, line 2. Insert after the word “Member,” “or Resident Associate”.

Chapter III., Articles 1 and 2, to read as follows:—

"CHAPTER 3, ARTICLE 1. Elections of Fellows and Foreign Honorary Members shall be made by the Council in April of each year, and announced at the Annual Meeting in May.

ARTICLE 2. Nominations to Fellowship or Foreign Honorary Membership in any Section must be signed by two Fellows of that Section or by three voting Fellows of any Sections; but in any one year no Fellow may nominate more than four persons. These nominations, with statements of qualifications and brief biographical data, shall be sent to the Corresponding Secretary. All nominations thus received prior to February 15 shall be forthwith sent in printed form to every Fellow having the right to vote, with the names of the proposers in each case and a brief account of each nominee, and with the request that the list be returned before March 15, marked to indicate preferences of the voter in such manner as the Council may direct. All the nominations, with any comments thereon and with the results of the preferential indications of the Fellows, received by March 15, shall be referred at once to the appropriate Class Committees, which shall report their decisions to the Council, which shall thereupon have power to elect. Persons nominated in any year, but not elected, may be placed on the preferential ballot of the next year at the discretion of the Council, but shall not further be continued on the list of nominees unless renominated.

Notice shall be sent to every Fellow having the right to vote, not later than the fifteenth of January, of each year, calling attention to the fact that the limit of time for sending nominations to the Corresponding Secretary will expire on the fifteenth of February."

Article 3. To be omitted.

Chapter IV., Article 2, to read as follows:

"If any officer be unable, through death, absence, or disability, to fulfil the duties of his office, or if he shall resign, his place may be filled by the Council in its discretion for any part or the whole of the unexpired term."

Chapter VI., Article 1, paragraph 2, line 2. After the word "Members" insert "or Resident Associates".

Paragraph 3, line 2. After the word "Fellows" omit "and"; after the word "Members" insert "and Resident Associates".

Article 2, paragraph 2. After the word "Fellows" insert "or Resident Associates".

Paragraph 3, line 3. After the word "Fellows" insert "and Resident Associates".

Paragraph 4, line 1. After the word "Fellow" insert "and Resident Associate".

Chapter VII., Article 2, line 4. After the word "Fellows" insert "and Resident Associates".

Chapter VIII., Article 5, line 3. After the word "Fellow" insert "or Resident Associate".

Line 6. After the word "Fellow" insert "or Resident Associate".

Chapter IX., Article 4. After the word "Fellowship" insert "or Resident Associateship".

Article 7. In place of the word "Memoir" insert the words "biographical notice".

Chapter XI., Article 4, line 2. After the word "Fellow" insert "or Resident Associate".

Line 3. After the word "Fellow" insert "or Resident Associate".

Article 5. After the word "Fellow" insert "or Resident Associate".

Standing Vote 2. After the word "Fellows" insert "or Resident Associates".

Standing Vote 4, paragraph 1. To read as follows: —

"There may be chosen by the Academy, under such rules as the Council may determine, one hundred Resident Associates. Not more than forty Resident Associates shall be chosen in any one Class."

Paragraph 2. To be omitted.

Paragraph 3. In place of the words "one half that" insert "the same as those".

Add Standing Vote 5, as follows: —

"Communications offered for publication in the Proceedings or Memoirs of the Academy shall not be accepted for publication before the author shall have informed the Committee on Meetings of his readiness, either himself or through some agent, to use such time as the Committee may assign him at such meeting as may be convenient both to him and to the Committee, for the purpose of presenting to the Academy a general statement of the nature and significance of the results contained in his communication."

On motion, it was

Voted, To amend the Statutes in accordance with the report, the amendment to Chapter 3, to take effect May 9, 1918.

On motion of J. J. Putnam, it was

Voted, That the President be authorized to sign the following letter:

"Dear Sir:

Some of the personal friends and colleagues of Josiah Royce, who believe that his work and his character made a deep impression upon a wide circle of men and women, and that he became, in fact, the centre of a large spiritual community, many of whose members were unknown to him, as he was unknown personally to them, feel that the reverence and affection which went out to him as a thinker and as a man should be embodied in some appropriate memorial of him at Harvard University, where he expressed himself in characteristic speech and writing for thirty years.

It is proposed, with this end in view, to create a fund of \$20,000 to be known as the Josiah Royce Memorial Fund, the income of which shall go to Mrs. Royce during her lifetime, and thereafter to the Department of Philosophy of Harvard College, to be used in such ways as the Department shall decide from year to year.

There are evident reasons why this appeal should not be delayed until the return of normal conditions, natural as such postponement might on some accounts appear to be. And further, the due honoring of our moral heroes though a privilege under all circumstances is especially a privilege and a duty in heroic times.

If you desire to subscribe, please send your check to Charles Francis Adams, Esq., Treasurer of Harvard College, 50 State Street.

(signed) The American Academy of Arts and Sciences,

by CHARLES P. BOWDITCH,  
*President.*"

The following Communications were presented:

Professor Clifford H. Moore. "The Decay of Nationalism under the Roman Empire."

Professor W. M. Davis. "New Coast Survey Charts of the Philippine Islands, and their bearing on the Coral-reef Problem."

The following papers were presented by title:

"Rotations in hyperspace," by C. L. E. Moore.  
"Extra-American Dipterophilous Laboulbeniales" and  
"New Laboulbeniales from Chile and New Zealand," by Roland Thaxter.

The meeting then adjourned.

One thousand and seventy-third Meeting.

MAY 8, 1918.—ANNUAL MEETING.

The Academy met at its House.

The PRESIDENT in the Chair.

There were forty-five Fellows and one guest present.

The Corresponding Secretary presented the following letters: from W. C. Gorgas, accepting Fellowship; from E. B. Drew, resigning Fellowship. The following biographical notices were also presented: J. M. Crafts, by T. W. Richards, L. P. Kinnicutt, by W. L. Jennings, S. P. Langley, by John Trowbridge, B. O. Peirce, by E. H. Hall, F. W. Taylor, by I. N. Hollis, O. C. Wendell, by S. I. Bailey, Robert Koch, by H. C. Ernst, A. S. Packard, by A. D. Mead, Ferdinand Bruntière, by Barrett Wendell and Louis Allard, Edward H. Hall, by W. W. Fenn, W. G. Sumner, by T. N. Carver, W. W. Howe, by W. H. Dunbar.

The Chair announced the deaths of Henry Adams, Fellow in Class III., Section 3, and Marcus Perrin Knowlton, Fellow in Class III., Section 1.

The following report of the Council was presented:—

Since the last report of the Council, there have been reported the deaths of twelve Fellows: J. W. White, J. H. Choate, B. L. Pratt, J. M. Crafts, H. L. Warren, W. DeW. Hyde, W. B. Clark, G. V. Leverett, P. S. Yendell, C. E. Faxon, Henry Adams, M. P. Knowlton; and of two Foreign Honorary Members: G. C. Maspero, Pasquale Villari.

Forty-eight Fellows have been elected, of which number, one has declined Fellowship. The elections of Alexis Carrel and Edward Weston have lapsed. The limit of time of acceptance has been extended for J. D. Irving. One Fellow has been dropped from the list for non-payment of dues. Two Fellows have resigned Fellowship.



Seven Foreign Honorary Members have been elected. The elections of four, (Barrois, Bonnat, Marconi and Nernst) have lapsed.

The roll now includes 515 Fellows and 67 Foreign Honorary Members.

The annual report of the Treasurer was read, of which the following is an abstract:—

## GENERAL FUND.

*Receipts.*

Balance, April 1, 1917 . . . . .	\$4,030.62	
Investments . . . . .	3,826.30	
Assessments . . . . .	3,285.00	
Admissions . . . . .	400.00	
Sundries . . . . .	264.05	\$11,805.97

*Expenditures.*

Expense of Library . . . . .	\$2,426.64	
Expense of House . . . . .	1,729.32	
Treasurer . . . . .	741.03	
Assistant Treasurer . . . . .	250.00	
General Expense of Society . . . . .	640.70	
Income transferred to principal . . . . .	282.92	\$6,070.61
Balance, April 1, 1918 . . . . .	5,735.36	
		<u>\$11,805.97</u>

## RUMFORD FUND.

*Receipts.*

Balance, April 1, 1917 . . . . .	\$2,270.62	
Investments . . . . .	3,295.05	
Sale of instrument returned . . . . .	40.00	\$5,605.67

*Expenditures.*

Research . . . . .	\$1,800.00	
Periodicals and binding . . . . .	55.41	
Publication . . . . .	680.97	
Sundries . . . . .	12.44	
Income transferred to principal . . . . .	154.64	\$2,703.46
Balance, April 1, 1918 . . . . .	2,902.21	
		<u>\$5,605.67</u>

## C. M. WARREN FUND.

*Receipts.*

Balance, April 1, 1917 . . . . .	\$2,592.27	
Investments . . . . .	1,428.39	\$4,020.66

*Expenditures.*

Research . . . . .	\$300.00	
Sundries . . . . .	3.17	
Income transferred to principal . . . . .	43.91	\$347.08
Balance, April 1, 1918 . . . . .		3,673.58
		<u>\$4,020.66</u>

## PUBLICATION FUND.

*Receipts.*

Balance, April 1, 1917 . . . . .	\$1,921.83	
Appleton Fund investments . . . . .	932.78	
Centennial Fund investments . . . . .	2,404.35	
Authors' Reprints . . . . .	118.70	
Sale of Publications . . . . .	181.26	\$5,558.92

*Expenditures.*

Publications . . . . .	\$2,570.37	
Sundries . . . . .	10.00	
Income transferred to principal . . . . .	163.06	\$2,743.43
Balance, April 1, 1918 . . . . .		\$2,815.49
		<u>\$5,558.92</u>

## FRANCIS AMORY FUND.

*Receipts.*

Investments . . . . .	\$1,222.50	\$1,222.50
-----------------------	------------	------------

*Expenditures.*

Publishing statement . . . . .	29.50	
Income transferred to principal . . . . .	1,193.00	\$1,222.50

The following reports were also presented: —

#### REPORT OF THE LIBRARY COMMITTEE.

The Librarian begs to submit the following report: —

During the year 73 books have been borrowed by 23 persons, including 15 Fellows and 5 libraries. Many books have been consulted, although not taken from the library. All books taken out have been satisfactorily accounted for.

The number of volumes on the shelves at the time of the last report was 35,228. 472 volumes have been added during the past year, making the number now on the shelves, 35,700. This includes 22 purchased from the income of the General Fund, 11 from that of the Rumford Fund, and 435 received by gift or exchange. The pamphlets added during the year number 203.

The expenses charged to the Library during the financial year are: —

Salaries . . . . .	\$1,824.00
Binding: —	
General Fund . . . . .	584.10
Rumford Fund . . . . .	20.60
Purchase of periodicals and books: —	
General Fund . . . . .	114.85
Rumford Fund . . . . .	34.81
Miscellaneous . . . . .	54.54
 Total . . . . .	 \$2,596.90

A. G. WEBSTER, *Librarian.*

May 8, 1918.

#### REPORT OF THE RUMFORD COMMITTEE.

The Committee organized November 14, 1917. Charles R. Cross was chosen to be chairman for the ensuing year and Arthur G. Webster, secretary.

During the past year grants for research have been made as follows:

November 14, 1917. To Professor Raymond T. Birge in aid of his research on the structure of Series Spectra . . . . . \$150

To Professor Ancel St. John for the purchase of a refrigerating machine and accessories to be the property of the Academy and

sent to Professor St. John for use in connection with his researches on Crystal Structure by means of X-Rays . . . . .	\$500
To Professor Theodore W. Richards in aid of the publication of Marie's Physical and Chemical data . . . . .	250
March 13, 1918. To Professor F. A. Richtmyer in aid of his researches on the Optical Properties of Thin Films (additional)	500
To Professor Arthur L. Foley, for his research on the photography of the electric spark at different periods of its history . .	150
To Dr. Olin Tugman in aid of his research on the Conductivity of thin metal films when exposed to ultra violet light . .	100

Reports of progress in their several researches have been received from the following persons: —

Messrs. C. G. Abbot, W. M. Baldwin, R. T. Birge, W. W. Campbell, A. L. Clark, D. F. Comstock, H. Crew, F. Daniels, E. B. Frost, R. C. Gibbs, H. C. Hayes, H. P. Hollnagel, L. R. Ingersoll, N. A. Kent, L. V. King (research finished), C. A. Kraus, E. Kremers, A. B. Lamb (research finished), C. E. Mendenhall, R. A. Millikan, H. W. Morse (research finished), C. L. Norton, F. Palmer, Jr., J. A. Parkhurst, H. M. Randall (research finished), T. W. Richards, F. A. Richtmyer, A. St. John, W. O. Sawtelle, A. W. Smith, F. A. Saunders, B. J. Spence, F. W. Very, D. L. Webster.

Most of these researches have been temporarily suspended because of the engagement of the various grantees in work for the Government.

The following paper has been published with aid from the Rumford Fund in the Proceedings of the Academy since the last annual meeting: P. W. Bridgman, "Thermo-electromotive Force, Peltier Heat and Thomson Heat under Pressure." Volume 53, No. 4, March, 1918.

At its meeting of January 9, 1918, it was unanimously voted by the Rumford Committee for the first time and on February 13, 1918, for the second time to recommend to the Academy the award of the Rumford Premium to Theodore Lyman for his researches on Light of very short wave length.

Professor Lyman, though a member of the Rumford Committee, has been abroad in the service of his country since autumn.

CHARLES R. CROSS, *Chairman.*

May 8, 1918.

## REPORT OF THE C. M. WARREN COMMITTEE.

The C. M. Warren Committee begs to submit the following report:

The unexpended balance of appropriations held by the Committee at the date of the last report was \$2271.50. In March, 1918, a further appropriation of \$800 was made by the Academy.

Only one application for a grant from this Fund has been received during the year, namely, that of Dr. James H. Ellis, for the sum of \$300 for the study of equilibrium conditions of the reaction employed in the Bucher process for the fixation of atmospheric nitrogen. This application was approved by the Committee on November 7, 1917. The results of this investigation should be of direct value to the National Government.

It appears to be the general experience of Trustees of research funds that the past year has been one of little or no activity with respect to applications for grants. These conditions will doubtless continue during the war, but it seems to the majority of your Committee that, at the close of the war, there is likely to be an increased field of usefulness for these funds, and that the income should be allowed to accumulate, or, if invested, it should still be regarded as available for appropriation for the present. One member (Professor Baxter) dissents from this view. The balance at the disposal of the Committee at the present time is \$2771.50 and the Treasurer reports that there is an unappropriated income amounting to about \$1300.

During the year Professor S. L. Bigelow has published the results of his investigations upon Metallic Osmotic Membranes.

The results of Professor J. F. Norris's investigations are being prepared for publication.

Respectfully submitted,

H. P. TALBOT, *Chairman.*

May 8, 1918.

## REPORT OF THE PUBLICATION COMMITTEE.

The Committee of Publication submits the following report for the period from April 1, 1917, to April 1, 1918.

During this period, 710 pages of the Proceedings have been issued, namely, Nos. 10-13 of Vol. 52, and Nos. 1-5 of Vol. 53.

Two of these numbers, namely 52: 12 and 53: 4, were paid for out of the funds of the Rumford Committee, the total charge against the Rumford Fund being \$680.97.

The accounts of the Committee of Publication stand as follows:

Balance on hand April 1, 1917 . . . . .	\$1,756.29
Appropriation for 1917-1918 . . . . .	3,000.00
Proceeds from sale of publications . . . . .	181.26
Total available funds . . . . .	\$4,937.55
Expenses . . . . .	2,451.67
Balance on hand April 1, 1918 . . . . .	\$2,485.88

During the present year, authors have ordered "extra" reprints through the Committee, to the amount of \$118.70.

Respectfully submitted,

EDWARD V. HUNTINGTON, *Chairman*.

May 8, 1918.

#### REPORT OF THE HOUSE COMMITTEE.

The House Committee submits the following report for 1917-18.

With the balance left from last year, an appropriation of \$1600 and money received from other societies for the use of the rooms, the Committee has had at its disposal the sum of \$1789.62. The total expenditure has been \$1769.32, leaving an unexpended balance on April 1, 1918, of \$20.30. The expenditure has been as follows:

Janitor . . . . .	\$869.00
Electricity { A. Light . . . . .	92.40
{ B. Power . . . . .	46.80
Gas . . . . .	12.73
Water . . . . .	8.00
Telephone . . . . .	57.91
Coal { Furnace . . . . .	582.30
{ Water Heater . . . . .	20.30
Care of elevator . . . . .	23.19
Ice . . . . .	15.00
Janitor's materials . . . . .	21.31
Upkeep . . . . .	20.38
Total expenditure . . . . .	\$1,769.32

The amount of \$40. contributed by other societies for the use of the building leaves the net expense of the House \$1729.32.

A private subscription enabled the Committee to equip the library stack building with double windows fitted with rubber gaskets. These have proved effective in greatly diminishing the amount of dirt that collects on the books. It is thought that in an ordinary winter the result will be a material saving in coal.

Meetings have been held as follows:—

The Academy . . . . .	8
Harvard Biblical Club . . . . .	5
Colonial Society . . . . .	4
American Antiquarian Society . . . . .	1
Archaeological Institute of America . . . . .	1

The rooms on the first floor have been used many times for Committee meetings.

In the death of William J. Reardon, on February 9, at the Cambridge Tubercular Hospital, the Academy has lost a faithful and efficient employee, who since January, 1912, has given the care of the building undivided attention.

Respectfully submitted,

G. R. AGASSIZ, *Chairman.*

May 8, 1918.

On recommendation of the Rumford Committee, it was  
*Voted*, To award the Rumford Premium to Theodore Lyman, of Cambridge, Mass., for his Researches on Light of very short Wave-length.

On motion of the Treasurer, it was

*Voted*, That the Annual Assessment be ten (\$10) dollars.

The annual election resulted in the choice of the following officers and committees:—

CHARLES P. BOWDITCH, *President.*

ELIHU THOMSON, *Vice-President for Class I.*

WILLIAM M. DAVIS, *Vice-President for Class II.*

GEORGE F. MOORE, *Vice-President for Class III.*

HARRY W. TYLER, *Corresponding Secretary.*

WM. STURGIS BIGELOW, *Recording Secretary.*

HENRY H. EDES, *Treasurer.*

ARTHUR G. WEBSTER, *Librarian.*

*Councillors for Four Years.*

GEORGE D. BIRKHOFF, of Class I.  
CHARLES H. WARREN, of Class II.  
FREDERIC DODGE, of Class III.

*Finance Committee.*

HENRY P. WALCOTT, JOHN TROWBRIDGE,  
HAROLD MURDOCK.

*Rumford Committee.*

CHARLES R. CROSS, ARTHUR G. WEBSTER,  
EDWARD C. PICKERING, ARTHUR A. NOYES,  
LOUIS BELL, ELIHU THOMSON,  
THEODORE LYMAN.

*C. M. Warren Committee.*

HENRY P. TALBOT, CHARLES L. JACKSON,  
WALTER L. JENNINGS, ARTHUR D. LITTLE,  
ARTHUR A. NOYES, GREGORY P. BAXTER,  
WILLIAM H. WALKER.

*Publication Committee.*

EDWARD V. HUNTINGTON, of Class I.  
JAY B. WOODWORTH, of Class II.  
ALBERT A. HOWARD, of Class III.

*Library Committee.*

HARRY M. GOODWIN, of Class I.  
THOMAS BARBOUR, of Class II.  
WILLIAM C. LANE, of Class III.

*House Committee.*

GEORGE R. AGASSIZ, LOUIS DERR,  
WM. STURGIS BIGELOW.



*Committee on Meetings.*

THE PRESIDENT,

WILLIAM M. DAVIS,

THE RECORDING SECRETARY,

EDWIN B. WILSON,

GEORGE F. MOORE.

*Auditing Committee.*

GEORGE R. AGASSIZ,

JOHN E. THAYER.

The following gentlemen were elected Fellows of the Academy:—

Henry Bayard Phillips, of Boston, to be a Fellow in Class I.,  
Section 1. (Mathematics and Astronomy.)

David Locke Webster, of Ann Arbor, to be a Fellow in Class I.,  
Section 2. (Physics.)

Edmund Burke Delabarre, of Providence, to be a Fellow in  
Class III., Section 1. (Theology, Philosophy and Jurisprudence.)

William Herbert Perry Faunce, of Providence, to be a Fellow  
in Class III., Section 1. (Theology, Philosophy and Jurisprudence.)

Leighton Parks, of New York, to be a Fellow in Class III.,  
Section 1. (Theology, Philosophy and Jurisprudence.)

Endicott Peabody, of Groton, to be a Fellow in Class III.,  
Section 1. (Theology, Philosophy and Jurisprudence.)

Francis Greenwood Peabody, of Cambridge, to be a Fellow in  
Class III., Section 1. (Theology, Philosophy and Jurisprudence.)

Edward Capps, of Princeton, to be a Fellow in Class III.,  
Section 2. (Philology and Archaeology.)

George Lincoln Hendrickson, of New Haven, to be a Fellow in  
Class III., Section 2. (Philology and Archaeology.)

Elijah Clarence Hills, of New York, to be a Fellow in Class III.,  
Section 2. (Philology and Archaeology.)

Rudolph Schevill, of Berkeley, to be a Fellow in Class III.,  
Section 2. (Philology and Archaeology.)

Brooks Adams, of Quincy, to be a Fellow in Class III., Section 3.  
(Political Economy and History.)

Isaac Minis Hays, of Philadelphia, to be a Fellow in Class III., Section 3. (Political Economy and History.)

Gamaliel Bradford, of Wellesley Hills, to be a Fellow in Class III., Section 4. (Literature and the Fine Arts.)

Charles Allerton Coolidge, of Boston, to be a Fellow in Class III., Section 4. (Literature and the Fine Arts.)

Edward Waldo Forbes, of Cambridge, to be a Fellow in Class III., Section 4. (Literature and the Fine Arts.)

Morris Gray, of Chestnut Hill, to be a Fellow in Class III., Section 4. (Literature and the Fine Arts.)

Archer Milton Huntington, of New York, to be a Fellow in Class III., Section 4. (Literature and the Fine Arts.)

Thomas Nelson Page, of Washington, to be a Fellow in Class III., Section 4. (Literature and the Fine Arts.)

Walter Hines Page, of Garden City, to be a Fellow in Class III., Section 4. (Literature and the Fine Arts.)

The following communications were presented:—

Professor Henry P. Talbot, "The Nitrogen Question and the War."

Professor Forris J. Moore, "Graphic Formulas of Organic Chemistry: To what extent may they be considered true pictures of Molecular Structure?"

The following papers were presented by title:—

"On Stability in Dynamics." By G. D. Birkhoff.

"I. Diagnoses and Notes relating to tropical American Eupatorieae. II. A descriptive Revision of the Colombian Eupatoriums. III. Keyed Recensions of the Eupatoriums of Venezuela and Ecuador." By B. L. Robinson.

The meeting then adjourned.

## BIOGRAPHICAL NOTICES.

---

	PAGE
CHARLES FRANCIS ADAMS	776
SIR BENJAMIN BAKER	781
FERDINAND BRUNETIÈRE	
BARRETT WENDALL AND LOUIS ALLARD	782
ARTHUR TRACY CABOT	793
CYRUS BALLOU COMSTOCK	799
JAMES MASON CRAFTS	801
EDMONDO DE AMICIS	804
WILLIAM WATSON GOODWIN	805
EDWARD HENRY HALL	816
WILLIAM WIRT HOWE	818
LEONARD PARKER KINNICUTT	821
ROBERT KOCH	825
SAMUEL PIERPONT LANGLEY	828
THOMAS RAYNESFORD LOUNSBURY	831
CHARLES SEDGWICK MINOT	840
ALPHEUS SPRING PACKARD	848
BENJAMIN OSGOOD PEIRCE	850
ISRAEL COOK RUSSELL	855
AUGUSTUS SAINT GAUDENS	859
WILLIAM SELLERS	861
EDWARD HENRY STROBEL	863
WILLIAM GRAHAM SUMNER	866
FREDERICK WINSLOW TAYLOR	870
FRIEDRICH DANIEL VON RECKLINGHAUSEN	
W. T. COUNCILMAN	872
OLIVER CLINTON WENDELL	875

## CHARLES FRANCIS ADAMS (1835-1915)

Fellow in Class III, Section 3, 1871.

Charles Francis Adams, of famous ancestry, was born in Boston, May 27, 1835, the second son of Charles Francis and Abigail Brown (Brooks) Adams. Of his early education and associations he has said much in his "Autobiography," but heredity counted for much in his characteristics. He had a clear recollection of his grandfather, John Quincy Adams, then engrossed by his contest for freedom, and he had inherited a questioning spirit which placed him in opposition to the social and political conventions of the day. Passing through a private school at Hingham and the Boston Latin School he entered Harvard College and pursued the usual course of studies without indication of possessing unusual aptitude or a special bent in any one direction. On graduating in 1856 he entered the law office of Dana and Parker. The personal relations with two such men exerted a strong influence upon the young Adams, to whom law could never be a serious profession any more than it was to his grandfather; but the writings of the English scientists and the speculations of Spencer were an even stronger influence, encouraging his tendency to question existing conditions and to test the strength of the economic and political structure on which the democratic community rested.

The war of secession interrupted this training in the law, though Mr. Adams did not at first consider military service as necessary. His father had been appointed United States Minister to the Court of St. James and his son was in charge of his business at home. A younger brother, Henry, accompanied his father to London to be his private secretary, and on Charles rested the management of the family affairs. The call, however, became too strong to be resisted, and in December, 1861, he received a commission as First Lieutenant in the First Massachusetts Cavalry. His service exercised a lasting influence upon his career, for it later engaged him in a series of studies upon the war which placed him high among critics of military strategy, and which yielded rich return in the connected field of the diplomacy of the period. Serving in South Carolina and Virginia, he became Captain in October, 1862, was chief of squadron through the campaign of Gettysburg and in the advance upon Richmond, and in the autumn of 1864 was transferred as Lieutenant-Colonel to the Fifth Massachusetts Cavalry

(colored). Seriously affected in health he was ordered home in 1865, and while there he received an invitation to join the military family of Major-General Humphreys, as Assistant Inspector General. Such was his idea of his duty to his colored regiment that he declined this flattering offer. He entered Richmond at the head of his regiment in April, 1865, but was obliged to resign on account of broken health. He subsequently received the brevet of Brigadier General. His later opposition to the scandalous waste in pensions and the manifestly dishonest methods of agents in securing them called out no little hostile criticism on his military service; but the charges were easily disproved or explained by him, and the record shown to be highly honorable to himself. In the face of great difficulties he won for himself a reputation for attention to duty, a desire to master the needs of the service and a care for detail and discipline which won for him the notice of his superior officers and the devotion of his followers.

Returning from the army he proposed to resume the study and practice of the law, but the social conditions which followed the war called upon his interest and directed his energy into a field of investigation which he made his own. Conscious of a certain faculty for clear expression and an unusual quality of style he wrote much on currency, politics and tax questions. The situation in which the railroads were left by the war attracted his study, and he soon gained prominence in a field where reforms were much needed and where New England, thanks to him, was to lead the war to better conditions. His fearless denunciation of dishonest practices and his clean cut policy for a better conduct of railroad management led to his appointment on the first really effective State Board of Railroad Commissioners, that of Massachusetts. For ten years his best service was rendered in this capacity, and for seven years, as chairman of the commission, he wrote its reports and established it on such a plane that it became the model of similar commissions, state and national. These reports may still be read with profit for their remarkable grasp of an intricate subject and for their definite propositions for bettering the condition of the railroads and their relations to the state. So thorough was the plan worked out that it was readily applied to the electric roads when they came into existence. He was called upon to serve as a government director on the Union Pacific Railroad, becoming the President of that road in 1884. This naturally led to his resignation from the State commission. He did much to lift the Union Pacific out of the slough of ill repute into which it had fallen, and did much more than a less honest and fearless reformer could have accomplished; but he

never looked with satisfaction upon the experience, for he was contending against influences of a sinister character which in the end proved stronger than his own efforts. His confidence in the future of the road was fully justified in later years, and to its subsequent success Mr. Adams contributed more than was at the time recognized.

After leaving the army Mr. Adams had been occupied in public business and the affairs of a great railroad; there came to him now a period of comparative rest. So active a mind could not remain unoccupied. He took up the subject of education, and when on the State Board of Education, where he sat for only one year, he formulated a plan of studies to be followed in the common schools. As an Overseer of Harvard University from 1882 to 1907 he criticised freely, but also did much constructive work, one of the important items being his report on the English department which led to changes in that department greatly to its improvement. His challenge to the classics — *A College Fetish* — awakened wide interest, and to him was due the requirement in entrance examination of only one of the classical languages, instead of two. He reformed the school system of the town of Quincy, and the "Quincy School System" has been followed in many localities, for it applied business methods to the common schools, resulting in a higher efficiency.

Of Mr. Adams' historical work little need be said, for it speaks so well for itself. How he came to engage in it he has told in his "Autobiography," and for forty years it constituted his principal enjoyment, the best realization of his powers for investigation and exposition. Whether it was the story of the beginnings of the plantation of the Massachusetts-Bay, or the diplomatic career of his father, or a biography of a man of law and letters, the result proved his unusual qualification and high equipment. In each department he sought to be complete — to approach as near to finality as the records permitted. His "Three Episodes of Massachusetts History," which was really a history of the town of Quincy, is a model of local history, when treated in its relations to national history. It was in preparing this work that his thorough methods tempted him to edit Thomas Morton's "New-English Canaan" and the Winthrop-Weld tract on "Antinomianism in New England," two side-studies to the larger undertaking on which he left little still to be interpreted. The "Life of Richard Henry Dana" is also a model of its kind, wherein the subject of the biography is made to tell his own story, the compiler adding only what was needed for a full comprehension of the text. But how much the "compiler" added, and how he made clear the path to the

reader can be grasped only by a careful reading of the volume. As to the life of his father, he wrote an admirable and well-proportioned sketch of it for the "American Statesmen," but the larger adventure, planned on a very much larger scale, occupied much of his time and thought for years, and had been carried to 1861, when the end came. Certain it is that it can never be completed as he intended it, for his later studies in English and American records led him to modify many of his earlier conclusions. Invited in 1913 to give at Oxford the lectures on American history, he utilized the opportunity to gather a rich harvest of private and official correspondence which was to be used in the extended life of his father.

His connection with the Massachusetts Historical Society encouraged his historical leanings and offered him a vent for his many studies in American history. His value to the Society was early recognized, and he rapidly rose in the official line, becoming a member in 1875, the Vice-President in 1890, and the President in 1895, holding that position until his death. What he accomplished for the Society, changing it from a small social "club" to an active historical society, may be seen in the printed "Proceedings." He brought to it the same energy, the same questioning attitude, and the same fearlessness as had given him reputation as a writer on social problems. Possessing a true historical instinct he contributed freely from his own ability and called out from others the best that was in them in historical investigation. In time, in money, and in papers he did more for the Society than the records will show.

In 1871 he was elected a Fellow of the American Academy of Arts and Sciences. He was not a regular attendant on its meetings.

Mr. Adams married, November 8, 1865, Mary Howe Ogden of Newport, R. I., who survived him. He died in Washington, D. C., March 20, 1915.

Of Mr. Adams' many activities and positions, public and corporate, it would be impossible to speak here. The list would be a long one, and only a full presentation of each item could give a fitting conception of his aims and accomplishment. He was a man of letters, possessed of a style at once clear, trenchant and individual, and capable of deep investigation and an orderly presentation of conclusions. He had wide sympathies, was a generous supporter of social movements and agencies, and encouraged the younger generation by aid as well as by example. A liberal in religion, in politics and in social questions, he retained an open mind and an independent position, recognizing no party ties or dead conservatism. Eminently social,

he yet retained a certain shyness which invited open intercourse and suggested the strong nature beneath this genial surface. It was a privilege to win his regard and to be associated with him closely in his work and ambitions.

He left an "Autobiography" which is a frank and penetrating measure of himself. Naturally it is not complete, and his desire to explain his own conduct has made him unjust to himself. No other person could have said as much, or said it as well; it is therefore characteristic, and must be held in high estimation as an open and honest attempt at self-appreciation, a form of expression which has become all too infrequent. In every sense he was a lovable character, vivid, stimulating, loyal and independent.

WORTHINGTON CHAUNCEY FORD.

SIR BENJAMIN BAKER (1840-1907)

Foreign Honorary Member, Class I, Section 4, 1899.

Sir Benjamin Baker, K. C. B., K. C. M. G., D.Sc., LL.D., M. A. I., F. R. S., was born at Keyford, Frome, Somerset, March 31, 1840, and died suddenly from heart failure May 19, 1907. At the age of 16 he was apprenticed to Messrs. Price and Fox of Neath Abbey Iron works, and remained with them four years. During the next two years he was engaged on railway work, and in 1862 joined the staff of the late Sir John Fowler, with whom he remained associated until the death of the latter in 1898; — rising from the position of Junior Assistant to that of partner.

During this long period Mr. Baker was actively engaged upon various kinds of engineering work, including some works of the greatest importance. Although without collegiate training, Mr. Baker early established a reputation as an authority on the theory and practice of engineering, displaying a remarkable combination of practical and scientific knowledge. He was interested in education, and did much to bridge the gulf which had long separated theory from practice.

Much of Mr. Baker's work was connected with railways. He was consulting engineer for the earliest "tube" railway in London, and also for the first projected Hudson River Tunnel in this country. He was



for many years connected with great engineering works in Egypt. He was also consulted in the design and construction of railways and other engineering works in West Africa and other colonies, and in the construction of docks and bridges in England.

The two greatest works, with which his name will forever be associated, are the Forth Bridge in Scotland, and the Assuan Dam in Egypt.

The Forth Bridge, in its present form, owes its conception and design to him, who worked it out upon scientific principles with the greatest care. This bridge possessed for many years the longest span in the world, which is now only surpassed (and by only 90 feet) by the recently constructed bridge across the St. Lawrence at Quebec.

Mr. Baker was undoubtedly one of the greatest engineers that England or the world has ever produced. The great variety of his work, the care with which he studied and worked out the various problems upon which he was called to advise, the combination of experience, judgment, and scientific knowledge which he possessed, made him a tower of strength, upon which those who consulted him could rely with confidence. He was an honorary member of the American and Canadian Society of Civil Engineers, and of the American Society of Mechanical Engineers; and in 1895 was President of the British Institution of Civil Engineers. He became a Foreign Honorary Member of the American Academy of Arts and Sciences in 1899. His name and works will not be forgotten. He did much for humanity, education, and the engineering profession, and to prove to the world that the development of civilization depends largely upon the work of the engineer.

G. F. SWAIN.

## FERDINAND BRUNETIÈRE.

(1849-1900.)

Foreign Honorary Member in Class III, Section 4, 1890.

## I.

Ferdinand Brunetière was born at Toulon, on the 19th of July, 1849. His father, a naval officer, came from the region still best remembered as La Vendée, about whose name lingers a romantic savor of loyalty to tradition. As a boy Brunetière seems to have had no fixed home, but an unusual experience of France, ranging from Provence to Brittany. He studied at the Lycée of Marseilles, and finally at the Lycée Louis Le Grand in Paris, where among his fellow-students was Paul Bourget. In 1869 he was examined for admission to the École Normale, and was rejected — an ironic incident in the life of a man destined to be the most eminent French critic of literature during the next thirty years.

In 1870 he served as a soldier in the defense of Paris. The subsequent excesses of the Commune probably intensified his temperamental distrust of revolution as distinguished from evolution. The next four or five years he passed obscurely, reading and studying with characteristic intensity and precision, but supporting himself by teaching at secondary schools. Among his fellow-teachers he again met Paul Bourget, to whose thenceforth close friendship he owed the chance which fixed the outlines of his career.

In 1875, the director of the *Revue des Deux Mondes* asked Bourget to write an article which required more conservative affection for literary tradition than Bourget then cherished. He therefore called the attention of the director to his friend Brunetière, whose opinions happened to coincide with those desired. This almost accidental introduction to the *Revue des Deux Mondes* not only brought to public notice the remarkable individuality of Brunetière, but began the relation between the man and the review destined to last and strengthen steadily. For years before he died, people thought of them together — almost as one. Though Brunetière in time found many other vehicles of expression, his numberless writings for the *Revue des Deux Mondes* were the basis of all the rest. Yet his

other fields of work were various and noteworthy. In 1887, for example, his rejection at the *École Normale* was more than nullified by his appointment there as a lecturer on literature. He was soon recognized as, on the whole, the most distinguished lecturer of his generation; even by those who dissented from his principles and disliked the massive power of his written style. No teacher has ever had much more influence on his pupils. Public lectures presently fell to him, at the Sorbonne, in various regions of France, and finally in foreign countries — in Italy, in Spain, in Holland, in Switzerland, in the United States. Meanwhile he had other recognitions,—the Legion of Honor, for example, in 1887. Six years later, in 1893, he received the crown of French literary distinction, admission to the *Académie Française*. In this year, he became head of the *Revue des Deux Mondes*. He remained so for the rest of his life.

In 1895 came the beginning of the last phase of his career. During a visit to Rome, he had a private audience with Leo XIII, of which the result was an article in the *Revue des Deux Mondes* implicitly setting forth the opinions uttered by the Pope, and also implying Brunetière's increasing disposition to accept Catholic orthodoxy. Up to this time he had been technically a free thinker, whose freedom of thought had led him to increasing respect for tradition. Before long, he joined the church, and presently became, so far as a layman could be, the most conspicuous exponent in France of intelligent Catholic thought. The politics and the passions of that time and of his ensuing years made this course at once bold and self-sacrificing. The tendency of the French government was by no means favorable to established religion; the Dreyfus affair gave rise to discussions and misunderstandings — profoundly honest on both sides — which intensified beyond precedent the warmth of feeling always smouldering beneath differences of religious and political principle; and finally the abolition of the Concordat disestablished the church in France. Meanwhile Brunetière was deprived of his chair at the *École Normale*, and was refused all opportunity of teaching in any institution under government control, such as the established universities and the *Collège de France*.

Though by this time stricken with the tuberculosis which proved fatal, he never relaxed his energy, nor his prodigious fecundity of expression. So long as his voice lasted, he lectured still, his private lecture-rooms always full to overflowing. When his voice was no longer at his command, he wrote if possible more copiously and vigorously than ever. During the last year of his life he exhibited

his highest powers, as a critic, a thinker and a man of letters, in what he wrote concerning matters literary, political and religious alike. He died at Paris, the mere shadow of a body enshrining the full power and brilliancy of his mind, on December 9th, 1906.

## II.

Among the numerous notices of Brunetière, and of his strong and copious literary work during a full thirty-five years, three stand out, as deeply sympathetic. Immediately after his death, Monsieur Paul Bourget sent *Le Temps* a letter of tenderly personal reminiscence; this is published in Bourget's "Pages de Critique et de Doctrine," (1912) I, 282-293. Less than a month later, the *Revue des Deux Mondes*, for January, 1907, published an analogous paper by the Vicomte Eugène-Melchior de Vogüé, like Bourget a fellow academician and a personal friend, though in this case the friendship began after Brunetière's reputation had become established; the article is reprinted in Monsieur de Vogüé's "Les Routes" (1910), 202-225. And in the *Revue des Deux Mondes* (1 March, 1908, and 1 April, 1908) Brunetière's pupil, Monsieur Victor Giraud, published a more careful study of the master's life and work, which was later included in Monsieur Giraud's "Maîtres de l'Heure" (1912), 59-137. All three of these articles are critical in that excellent sense of the word which implies earnest effort sincerely to set forth what is best in thought and in life, with no sentimental suppression of what is not quite so. All three are affectionately sympathetic. Together they give an extraordinary impression of a character which all must respect, even though now and again disposed hardly to agree with the conclusions honestly and combatively set forth in its profuse and scattered utterances.

The power of summary possessed by Monsieur Victor Giraud is held by those whose works he has had occasion to summarize remarkable for intelligence, for sympathy and for justice. In the case of Brunetière, his summary is based not only on love for a teacher who stimulated him when he was a student, and thereafter was a personal friend and guide, but also on thoughtful study of everything that Brunetière had published. "Thirty-two volumes," he tells us—mostly collections of articles for the *Revue des Deux Mondes*, etc.,—"two pamphlets, five editions of (French) classics, a hundred articles or so scattered far and wide and never collected, represent the visible

and tangible work of a man who was not only a writer but a professor, a lecturer, and the editor of the *Revue*, and who died at the age of fifty-seven. He touched on criticism, history, aesthetics, sociology, ethics, pedagogics, philosophy, apologetics, and theology; and if he did not remake them all, he seldom left things exactly as he had found them. By signs like that you can recognize the true masters. Brunetière was probably among the two or three greatest influences upon the French thought of his time."

To attempt here any detailed summary of this great though fragmentary work would be presumptuous. It is not, perhaps, presumptuous to say that Monsieur Giraud's memorable tribute to his master and friend revives and confirms an impression which Brunetière made on American readers and hearers during his life time. Nobody was ever more French than he, in uncompromising intellectual honesty, in untiring assiduity of work, in a vigor and a precision of thought inexhaustible and ultimate, in fervent effort to attain and to set forth the truth. Nobody was ever more French, either, in what may perhaps be called the limitations inevitable to precision. To see things clearly, you must fix your point of view. This fixed, you may look either backward, bemoaning the faded virtues of the past; or forward, anticipating the gleaming virtues of the future; or you may strive to define that inexorable process of change which the optimism of America calls progress and complacently assumes to tend heavenward.

Brunetière, intensely French, chose the third of these alternatives, always conscious that the present is the creature of the past and the creator of the future. In their passage from past to future, those who love the past are apt to lament and those who love the future are apt enthusiastically to hope; meanwhile, the general run of mankind are content to live in the present, thoughtlessly accepting commonplace. Now commonplace is the instinctive expression of humanity:—in literature, for example, it asserts the enduring merit of works which survive to be classics; in religion, it comfortably accepts the doctrine of the church. Which is all very sensible; but, when asked to account for its conclusions, its reasons are apt to be stupid and flimsy. A rather shallow kind of conventional thought, nowadays called radical, assumes that the task of intelligence is to dissipate the fog of canting reasons in which commonplace assumptions are enshrouded, and ingenuously believes that folly can thus be swept nowhere. A more distinguished type of mind, admitting the old reasons often wrong, is not willing to conclude that the old assumptions are equally so. It

believes that the highest task of the intellect is not to reject what has been unreasonably accepted, but rather to give true reasons for sound conclusions hitherto accepted chiefly as a matter of instinct. This seems on the whole to have been the purpose of Brunetière from beginning to end. There has hardly ever been work more faithfully true than his to an ideal once stated in this country as the aim and end of all education — the illumination of the commonplace.

### III.

We are fortunate in having among us now a French scholar and man of letters who was a pupil of Brunetière at the École Normale. Without his friendly aid, this memoir must have stayed secondary. He has kindly consented to make it more memorable. So instead of proceeding with my own fragmentary memories of Brunetière when he was hereabouts in 1897, and when I saw him at Paris in 1905, I have been so bold as to ask Professor Louis Allard, of Harvard University, to send the Academy some account of his personal memories of the master, and of the master's teaching. And, remembering that "translation is at best like the back of an embroidery" I have asked him to send it in his own French words. Whoever reads them will surely share my gratitude for his kindness.

BARRETT WENDELL.

### IV.

Mr. le Professeur Barrett Wendell m'a fait l'honneur de me demander d'ajouter quelques notes personnelles à l'article substantiel qu'il a écrit sur Ferdinand Brunetière.

Je le remercie de l'occasion qui me permet de rendre hommage à la mémoire d'un maître que j'ai beaucoup admiré et aimé. Ce n'est donc pas que je me propose ici de donner de son oeuvre une analyse critique. On peut la trouver dans les livres que Mr. Wendell a signalés, et surtout dans "Les Maîtres de l'heure" de Mr. Victor Giraud, qui me paraît avoir dit sur le sujet le mot définitif. Brunetière, d'ailleurs, avait désiré un jour qu'il fût son biographe; et je ne doute pas qu'il n'eût été content d'un portrait dessiné par le disciple avec amour et fidélité. Mon but est plus modeste. Sur l'invitation de Mr. Wendell, je retracerai de mémoire quelques traits de l'homme et du professeur, qui pourront peut-être rendre un peu de relief et de

couleur à une figure jadis si vivante, et qui n'auront d'autre mérite que d'être l'oeuvre d'un témoin oculaire.

J'ai eu Ferdinand Brunetière pour professeur de littérature française, pendant ma seconde année d'École Normale. Il était alors à l'apogée de sa carrière. Directeur de la Revue des Deux Mondes, membre de l'Académie française, il avait été récemment, dans l'amphithéâtre de l'ancienne Sorbonne, le conférencier acclamé d'un public de dix-huit cent personnes qui avaient suivi avec enthousiasme ses leçons sur l'évolution de la poésie lyrique. Ce public avait consacré sa réputation d'orateur; et c'était de son éloquence qu'il était le plus fier. Son éclatant succès lui avait été d'autant plus sensible qu'il rencontrait de l'opposition, peut-être devrai-je dire, de l'antipathie chez certains professeurs de la Faculté des Lettres, depuis surtout sa visite au Vatican et le fameux article qui en avait été le résultat. A coup sûr, les applaudissements qui l'interrompaient ou saluaient la fin de chaque leçon, en prenaient pour son amour-propre plus de saveur. Quelque temps avant l'ouverture de son cours, il avait confié à l'un de mes amis: "Je leur montrerai ce que je peux faire chez eux." Et certes, il n'avait jamais été plus inspiré: grand critique, il s'était révélé maître de la parole.

J'ai fait allusion à cet article qui souleva tant de polémiques, et qui lui attira tant de reproches, bien qu'il protestât n'avoir jamais voulu proclamer la faillite de la science. Comme le remarque M<sup>r</sup>. Wendell, son entrevue avec le pape Léon XIII était le point de départ d'une nouvelle orientation de sa pensée: il allait au catholicisme. Bientôt même, il devait délaisser les travaux de pure critique littéraire pour prendre une part de plus en plus active aux luttes religieuses de son temps.

C'est alors que normalien de la section des lettres de seconde année, j'assistai, avec mes vingt-six camarades, à ses deux cours sur Molière et sur l'Encyclopédie du XVIII<sup>e</sup> siècle.

Les bruyantes discussions qui venaient de s'agiter autour de son nom stimulaient notre curiosité d'approcher d'un homme qui avait pris déjà une si grande autorité dans le monde intellectuel. Tous, nous ne l'avions vu que de loin, dans la salle de la Sorbonne, ou même nous ne le connaissions que par la Revue des Deux-Mondes. Quelques-uns, et parmi ceux là le Charles Péguy à vingt ans, à cause de leurs opinions politiques radicales ou socialistes, se tenaient sur leurs gardes, et adoptaient par avance une attitude défiante: ils reconnaissaient volontiers en lui le lettré et l'orateur, mais ils lui déniaient le droit ou la capacité de penser en philosophe.

Brunetière avait quarante-sept ans. Petit, maigre, et légèrement voûté, le front plissé, le visage fatigué et mélancolique, parfois éclairé d'un sourire ironique, il gardait l'empreinte de l'homme qui avait connu les labeurs d'une dure jeunesse, avait prodigieusement lutté pour parvenir, et s'était habitué à regarder sans illusions le monde et la vie.

Il venait à l'École avec un cahier à couverture de serge noire, qu'il ouvrait sur sa table, pour s'aider des grandes lignes du plan de sa leçon. Il ne le regardait que très rarement. Pendant une heure et demie, il nous parlait avec le même soin, la même verve, la même éloquence que si nous eussions été le public de ses grandes conférences de Sorbonne. Les yeux perçants et fureteurs sous le lourd lorgnon d'écailles circulaient autour de la petite salle comme pour nous saisir sous le joug de ses idées. Mais surtout ce qui s'imposait à nous dès le début, ce qui nous prenait, ce qui séduisait les plus rebelles à sa pensée, c'était cette voix si nette, si sonore, si métallique qui le servait à merveille, lorsqu'il lisait des textes pour illustrer le cours. Et au moyen de cet organe incomparable, il développait, dans un ordre aussi inflexible qu'un sermon de Bossuet et dans des phrases souvent périodiques qui coulaient de ses lèvres comme une improvisation naturelle, ces séries d'arguments qui se pressaient vers leur conclusion avec une vivante logique. C'est qu'il ne lui suffisait pas de jeter sur le solide charpente de ses leçons les chaînes des faits et des idées; quand le sujet le portait, il y mettait un mouvement qui venait de l'ardeur de sa conviction et de son énergie de lutteur. C'était de la dialectique vibrante. Un geste lui était familier. Entraîné par la force de ses idées, et pour donner à l'une d'elles plus d'accent, il jetait la main droite en avant, tout en tirant sa manchette.

Parfois ce geste s'adressait à un adversaire qu'il lui fallait réfuter, ou raillait une sottise, ou détruisait une erreur: mouvement de polémiste qui adorait le combat aussi bien contre les morts que contre les vivants, Voltaire et Jean-Jacques Rousseau, comme Ernest Renan ou Berthelot. Il lui arrivait de donner à son humeur un tour amusant. Dans une de ses premières leçons sur Molière, il avait pris à partie le notaire qui, dressant l'inventaire de la succession du poète, avait oublié sa bibliothèque. Je l'entends encore, de sa voix mordante et scandant les mots, la manchette en avant, dire son fait au tabellion comme s'il eût été encore de ce monde: "Eh! qu'est ce que cela nous importe, Messieurs, que cet imbécile de notaire ait pensé à nous donner le compte des chemises du grand homme si tout justement il a oublié l'essentiel qui était de nous apprendre quels livres il lisait



sans doute le plus volontiers?" — Le reproche était mérité. Brunetière regrettait une source précieuse de renseignements sur la formation intellectuelle de Molière. Il donnait aussi par là un exemple de la conscience de cette érudition inépuisable qu'il possédait en littérature, en histoire, et en philosophie. Il paraissait avoir tout lu et tout retenu. Oui, sans doute, il était l'homme ou l'orateur des idées générales; il y ramenait toute sa science et toute sa réflexion. Mais il n'a jamais prononcé ou écrit une phrase à vide; sa logique et son éloquence reposaient sur des faits accumulés par une lecture inlassable, étudiés avec une conscience rigoureuse, classés avec une réflexion tenace. J'en ai une preuve sous les yeux, dans des notes que j'ai conservées de ses conférences. Seulement, les faits n'étaient pour lui que la base indispensable. "Faites-les vivre" nous disait-il. Ne prenez l'érudition que comme un moyen et non un but. Des faits, doivent jaillir les idées. Et c'est ainsi que son enseignement était à la fois si nourri et si vivant. Voici comment il pratiqua sa méthode en collaboration avec ceux d'entre nous qui devaient, en troisième année, subir le concours d'agrégation des lettres. Il s'était chargé des six premières leçons sur Molière, chefs-d'œuvre par la sûreté de l'information et la pénétration de la critique. Puis, à tour de rôle, chacun de nous devait analyser et discuter une comédie; pendant la dernière demi-heure, il corrigeait la conférence de l'élève et quelquefois la refondait. Ce travail achevé, il fit six leçons de conclusion qui étaient six leçons d'idées générales, interprétation des faits ou des remarques que les analyses avaient fournis ou suggérées sur l'art, le naturalisme et la morale de Molière.

On a parlé souvent de son dogmatisme, et on lui a fait la réputation d'une sorte de préfet de police de la littérature, qui ne pouvait souffrir la contradiction. Certes, il tenait fortement à ses idées, et il combattait pour elles de toute son âme, avec une puissance oratoire que Jaurès seul, de son temps, a égalée. Mais ce serait le voir sous le jour le plus faux que de croire qu'il cherchait à imposer ses opinions comme la vérité intangible. Au contraire, il n'appréciait rien tant chez les autres que l'indépendance de l'esprit, et il aimait à solliciter la discussion.

Dans la seconde de ses conférences hebdomadaires, il traitait, comme je l'ai dit, des Encyclopédistes. Sujet brûlant alors, car la France, à la suite de l'affaire Dreyfus, était déchirée par les dissensions religieuses. En un temps où il passait par les premières étapes de sa conversion et commençait à s'affirmer comme le champion de l'Église, il avait vu l'occasion de rechercher au XVIII<sup>e</sup> siècle les origines de

nos luttes et de manifester un jugement à la lumière de ses nouvelles convictions. Quelques-uns de mes camarades, qui se groupaient autour de Jaurès, étaient prêts à lui opposer une vigoureuse résistance. Il le savait. Aussi, chaque fois, avant de parler, nous demandait-il de faire nos objections ou de poser des questions à propos de la leçon précédente. Si la discussion était offerte en termes courtois, il était heureux d'y entrer. Ce mérite fut éminent chez lui : ayant horreur pour lui-même, de l'opinion toute faite, du cliché, du convenu, il excitait ses élèves à en avoir le même dégoût ; avant tout, il leur imposait le devoir intellectuel de penser par eux-mêmes. Aussi a-t-il été un incomparable éveilleur d'esprits, et quinze générations de normaliens lui ont rendu cet hommage. J'emprunterai là dessus un témoignage significatif à un de mes contemporains de l'École, connu pour son socialisme anticlérical, et qui, lancé dans le journalisme, écrivait au lendemain de la mort de Brunetière : "Ce n'était pas seulement un professeur, c'était un *maître*... Ceux qui secouaient son joug en gardaient quand même l'empreinte... Frais émoulus du collège, ses élèves prenaient plaisir à brûler dans son feu tout ce qu'ils avaient adoré avec leurs maîtres de rhétorique. Brunetière n'enseignait pas l'admiration convenue, mais le doute méthodique et l'irrespect : il animait ses disciples de ses haines vigoureuses ; juste ou non, sa critique excitait l'intelligence, et en l'affranchissant des manuels, des clichés et des formules, lui apprenait à penser librement.,,

Comme je l'ai marqué au début, je n'ai pas l'intention de refaire ce qui a été si bien fait, l'analyse de son esprit et de son oeuvre. Je voudrais cependant dire un mot de sa conversion. J'étais son élève, au moment où il s'acheminait vers le catholicisme. Sa croyance était alors d'ordre tout intellectuel ; il ne devait arriver à la pratique que plus tard, à la pratique intégrale que vers la fin de sa vie. J'ai cru en ce temps-là, et comme beaucoup d'autres, que c'était pour des raisons d'ordre social qu'il acceptait la religion catholique, et je l'ai cru longtemps. En relisant plus attentivement ses Discours de Combat, j'ai changé d'avis, et j'ai admis une explication plus simple. Brunetière, à l'époque où il niait Dieu, la Divinité de Jésus et la liberté morale, admirait passionnément Bossuet. Tourmenté par les problèmes de notre origine et de notre fin, n'en trouvant pas la solution dans la philosophie, il fut amené à la demander à la révélation et à l'Église, et cela conduit par la main de notre grand orateur chrétien. Écoutons-le à Besançon, en 1900 : "Moi aussi, quand je me suis mis à l'école de Bossuet, nourri que j'étais des idées de mon temps et des leçons de mes maîtres, moi aussi j'ai résisté, et j'ai résisté longtemps.

Puis, quoi qu'on dise qu'un homme ne peut pas beaucoup sur un autre, j'ai trouvé dans ce commerce avec Bossuet tant de bon sens, tant de génie, tant de probité intellectuelle, que je me suis laissé faire. . . .” Oui, j'en suis convaincu aujourd'hui, c'est la lecture de Bossuet qui l'a amené au seuil du Vatican. A partir de 1895, il mit toute son ardeur de logique et toute la force de sa parole au service de l'idée religieuse. L'enseignement n'occupait plus dans ses préoccupations qu'une place secondaire. Cet apostolat lui apportait un immense surcroît de travail. Mais il avait travaillé toute sa vie et il affrontait ses multiples responsabilités avec une énergie surhumaine. C'est en ces années-là qu'il montra “ce que peut, selon le mot de Bossuet, une âme indomptable dans le corps qu'elle anime.” Ce corps portait les marques des labeurs acharnés de sa première jeunesse. M<sup>r</sup> Paul Bourget nous a raconté comment, après s'être livré tout entier pendant le jour à ses devoirs ingrats de professeur libre, en y montrant la conscience intransigeante qu'il eut toujours, il passait ses nuits à lire et à étudier. Dès l'âge de vingt-quatre ans, sa santé était compromise. Pourtant, il avait continué de travailler inlassablement. Alors qu'il était mon maître, la phthisie commençait à s'emparer de lui, ou, du moins, à le menacer. Il semblait défier la maladie, “en menant de front des travaux suffisants pour user quatre activités d'homme.” “Mon ami,” lui disait le Comte d'Haussonville, “la vie que vous menez est une gageure, vous la perdrez.”— “Qu'est-ce que cela fait?” répondait-il.— Pour lui la vie ne valait la peine d'être vécue que s'il pouvait s'en servir.— Pendant les dix dernières années, il fut un miracle perpétuel de volonté invincible: en voici un émouvant témoignage.

Un matin qu'il devait comme d'habitude venir à neuf heures et demie donner son cours sur l'Encyclopédie, nous avions lu dans les journaux que, très souffrant, la veille, il avait appelé en consultation deux illustres médecins spécialistes. A notre grande surprise, nous le vîmes apparaître à l'heure fixée. Ayant su que la presse avait répandu le bruit qu'il était gravement malade, il s'était habillé à la hâte, jeté dans un fiacre, et il était accouru nous apporter par le fait de sa présence son démenti. Il parlait de Montesquieu. Toutes ses énergies étaient ramassées dans ses yeux un peu fiévreux et dans sa voix plus vibrante et plus dominatrice peut être que de coutume. Soudain, il fut interrompu par une terrible quinte de toux qui le secouait tout entier et qui nous parut interminable. Nous attendîmes, douloureusement oppressés. Il acheva enfin de tousser, sourit de ce léger sourire ironique qui plissait parfois ses lèvres pincées et dit

comme pour s'excuser: "Messieurs, la nature est la plus forte." Puis il continua sa conférence jusqu'à onze heures, et retourna prendre le lit pour quelques jours. Tel était l'homme.

Sa vigueur morale se reflétait dans la gravité un peu janséniste de son allure. Il n'invitait pas la familiarité. Aussi ses ennemis, et ils étaient nombreux dans la littérature, dans la politique et dans le journalisme, le représentaient-ils comme d'abord revêche et hargneux. La vérité est que je n'ai pas connu d'homme plus poli, mais sa politesse était digne et mesurée comme d'un homme de Port-Royal; sa parfaite courtoisie dans sa conversation comme dans sa correspondance avait le ton des "Messieurs." Ce qui ne veut pas dire qu'il n'aimât pas à se détendre, jusqu'à la plaisanterie, et parfois au calembour. Dans ses cours, il avait des éclairs de raillerie mordante ou d'amusante mauvaise humeur qui nous faisaient rire. Chez lui, rue Bara, près du Luxembourg, ou dans son cabinet de la Revue des Deux-Mondes, quand il se sentait en confiance, il s'épanchait volontiers à propos des idées qui l'occupaient alors. Je dois dire que sa conversation tournait vite au monologue; mais elle apprenait ou suggérait tant de choses qu'on n'eût pas pensé à s'en plaindre. Ici et là, il décochait un trait à l'adresse de quelqu'un de ses contemporains. La dernière fois que je le vis, en 1904, pour lui rendre compte d'une mission littéraire dont je lui devais l'honneur, il me parla de différentes personnes que nous connaissions. D'un prélat dont il était vaguement question à Rome pour le cardinalat, il caractérisait la vertueuse mais un peu terne personnalité en ces mots; "c'est une sainte nullité"; d'un journaliste qu'il n'aimait pas, "c'est un écrivain qui est toujours à la veille d'avoir du talent"; ou encore d'un évêque canadien de passage à Paris, "aimable homme," disait-il, "mais qui a l'air de prendre la France pour un petit Canada". Et la malice, chaque fois, touchait juste. On m'a dit qu'à table, hôte ou invité, dans l'intimité de personnes qui lui plaisaient particulièrement, il pouvait être le plus étincelant des causeurs.

Sous le masque sévère, qui lui était le plus habituel, et qui effarouchait les timides, il cachait une bonté tendre que n'ont connue que ceux qui en ont été l'objet ou qui ont vécu près de lui. En vrai fidèle de l'esprit du grand siècle, il mettait une pudeur jalouse à dissimuler ses sentiments ou à en atténuer l'expression. Il les prouvait surtout, sans les montrer. Ce qui le caractérise de ce point de vue, c'est la manière dont il protégea les débuts de Paul Hervieu qu'il ne connaissait pas encore. Après l'avoir reçu froidement à propos d'un roman de jeunesse qu'il avait promis d'accepter pour la Revue des Deux

Mondes, en sa qualité de lecteur, et qui n'avait pas encore paru, il menaça Buloz, alors directeur, de donner sa démission, si le roman n'était pas inséré. Hervieu en sut que douze ans plus tard que Brunetière, devenu un de ses chers amis, avait joué son avenir pour rester fidèle à sa parole. Il poussait si loin la discrétion et la retenue dans la manifestation de sa confiance et de son estime que certains de ses anciens élèves n'en eurent la révélation qu'après sa mort. M<sup>r</sup>. Bédier, aujourd'hui le brillant successeur de Gaston Paris, au Collège de France, avait eu avec lui depuis l'École Normale des relations affectueuses qui n'avaient jamais été jusqu'à l'intimité. Grande fut sa surprise, lorsque M<sup>me</sup>. Brunetière lui apprit que par son testament, son mari l'avait chargé de l'examen et du classement de ses papiers. S'il était permis de parler de soi, j'ajouterais que j'ai eu l'expérience de cette bonté qui s'exerçait avec délicatesse et gravité. Mais il apportait dans le discernement de ses protégés et dans la manière d'accorder ses bienfaits la scrupuleuse conscience qu'il mettait à remplir ses devoirs de critique, de professeur et d'homme privé.

C'est sur ce mot de conscience que je voudrais terminer cette rapide esquisse. Puissant écrivain, orateur hors de pair, il a été dans sa vie comme dans son enseignement et dans son oeuvre littéraire un grand honnête homme.

LOUIS ALLARD.

ARTHUR TRACY CABOT, M.D. (1852-1912)

Fellow in Class II, Section 4, 1889.

It is not easy, at once adequately and briefly, to set forth even the salient facts and evolution of the life of a man of such varied activities and interests as was the late Arthur Tracy Cabot.

He was of complex ancestry, Scotch, Irish, English and Norman French (Chabot, Island of Jersey) blood mingling in his veins. One of his great grandfathers, Thomas H. Perkins, was perhaps the most conspicuous merchant of his day in Boston, public spirited, enterprising, a large man in every sense of the word. The Perkins Institution for the Blind is one of his monuments. Samuel Cabot married one of his daughters and became a partner in the firm of Perkins & Company. Samuel Cabot, jr., was the second son of this marriage, the first of

the family to embrace medicine as a profession. After the completion of his medical studies in Paris he went to Yucatan on the Stevens Expedition. His independence of thought and action, his sterling character, his services to this community as one of its leading practitioners and for many years surgeon to the Massachusetts General Hospital are still fresh in the memory of many.

Dr. Samuel Cabot married his distant cousin, Hannah Jackson, daughter of Patrick T. Jackson, whose brothers James and Charles were as eminent in medicine and law as was he in business.

Arthur, third son of this marriage, was born in 1852. From the Perkins-Cabot side he inherited largely his marked taste for nature, out-of-door manly sports and love of art, traits so prominent in some of the race as to be almost over-mastering. From the Jackson side he derived his physique, a slight but wiry frame, dominated by a will and sense of duty which go far to promote sustained effort. Promptly after his graduation at Harvard in 1872, he began the study of medicine, taking his M.D. in 1876, and serving as Surgical Internate at the Massachusetts General Hospital. He then went abroad, giving special attention to surgical pathology, but neglecting no opportunity of laying a firm foundation in all pertaining to the Healing Art. In Vienna and Berlin he got nothing helpful in the line of antiseptic surgery; but later passed a month in London, heard Lister's Inaugural Address at King's College, and ever after kept on the crest of the advancing wave of clean surgery. In 1877 he began general practice in Boston, and steadily won recognition, alike from the profession and the public. To surgery he had strong leanings from the first; but, conservative, cautious, ruled by reason more than impulse, always thinking things out to their ultimate results, it was not until ten or more years later that he gave up all strictly medical practice. From 1878 to 1880 he was Instructor at the Medical School in Oral Pathology and Surgery; from 1885 to 1896, Instructor in Genito-Urinary Surgery. He would, doubtless, have become full Professor but for his election to the higher position on the Corporation in the latter year. He was for several years Surgeon to the Carney Hospital, Assistant Surgeon at the Children's Hospital from 1879 to 1881, Visiting Surgeon 1881 to 1889; Surgeon to Out-Patients at the Massachusetts General Hospital, 1881 to 1886; Visiting Surgeon, 1886 to 1907.

As a general surgeon he was eminent; as a genito-urinary surgeon, pre-eminent. True surgeon that he was, his head always ruled his hand. He could not be persuaded into operating. He must be convinced in his own mind of its necessity or desirability; nor would

he undertake any operation which he thought could be better performed by another. This absolute integrity of character, combined with rare soundness of judgment and with manual skill, won him the implicit confidence of all who came into contact with him, and naturally led to a wide consulting practice. He was as painstaking and conscientious in the after-treatment as in deciding whether or not to operate. He never in the least shirked responsibility; but it wore upon him more than it does upon some men of different temperament, and prevented him from doing as much work as he might otherwise have done.

Among his contributions to general surgery may be mentioned his use of the valve acting dressing and chlorinated soda irrigation for empyema operations, and a wire splint for fractures of the lower leg, devised while Surgeon to the Children's Hospital, in large use throughout the world, and, curiously enough, save in Boston, known by his name. It displaced the old fracture box. He early advocated and practised incision *without drainage* for tubercular peritonitis. In 1874 to 1875 he assisted his father in the first two successful abdominal operations connected with the Massachusetts General Hospital. They were on hospital patients, but the operations were done in a neighboring house in Allen Street. It appears that Dr. Arthur Cabot did the first successful abdominal operation within the hospital walls in 1884, on a case of large strangulated umbilical hernia. The patient had been admitted to Dr. Hodges' service. He, however, being ill, Dr. Bigelow was taking his place, and Dr. Cabot, then Surgeon to Out-Patients, was assisting the latter. Dr. Cabot was called in the evening. Dr. Hodges had recently published a paper on cases of this nature, concluding that operation was always fatal, recovery occasional without operation. Dr. Cabot therefore sought Dr. Bigelow, whom he found at Dr. Hodges' house. He stated the case. Dr. Bigelow: "What do you want to do?" Dr. Cabot: "Operate." Dr. Bigelow: "Whether you operate or not the patient will die, therefore do as you like. Is not that so, Dr. Hodges?" Dr. Hodges: "No, if you operate he will die; if you don't he may get well." After some discussion, Dr. Bigelow agreed that Dr. Cabot should do as he liked, so he returned to the hospital, operated, and in a few weeks the patient was well. We tell the story thus in full for the light it throws on the state of surgery less than thirty years ago. In 1886, Dr. Cabot had three successful cases of laparotomy in rapid succession, one for ovarian cyst, two for fibroids.

Dr. Cabot's qualities did not escape the keen eye of the late Dr.



Henry J. Bigelow, who made him his heir, as it were, in litholapaxy, and thus led to Dr. Cabot's becoming the leader in genito-urinary surgery that he was, admitted to be such far and wide.

As evidence of his thoroughness and of the soundness of his judgment it may be mentioned that in his paper on "Rupture of the Bladder," 1891, and in another on "Rupture of the Urethra," 1896, he laid down rules of procedure which stand unchanged today.

Here, as well as elsewhere, may be mentioned that about 1886, realizing the importance of immediate pathological examination of many surgical cases while under operation in order to determine the scope and nature of the necessary operation, he and his brother Samuel established a fund of \$10,000, known as the "Samuel Cabot Fund for Pathological Research," in memory of their father. The interest on this fund is used for paying a pathologist to be on hand operating days and making such examinations as the surgeons require. If not the first, it was surely an early effort to make thorough pathological study go hand in hand with the surgical operation. Dr. Cabot was also the prime mover in starting the Clinico-Pathological Laboratory, was a leader in raising the necessary funds and planning the building. He became Librarian to the Hospital, and evolved order from chaos in the book and case records, both now thoroughly available.

He was President of the Massachusetts Medical Society in 1905 and 1906. In his visitations to the District Societies he did yeoman service in stirring up our profession to more actively interesting itself in the campaign against tuberculosis. It was probably this leadership which induced Governor Guild in 1907 to appoint him a Trustee of the Massachusetts State Hospitals for Consumptives, and at the first meeting of the Trustees, in September of that year, he was elected Chairman. The amount and quality of his work in this capacity deserves fullness of treatment, which, it is to be hoped, it will receive, but which it is impossible to give here. In his automobile he traversed the State to select suitable sites for the three hospitals for one hundred and fifty patients each. The North Reading Hospital was opened in the fall of 1908, those of Lakeville and Westfield early in 1909. The appropriation of \$300,000 was not exceeded, and the requirements were fully met at a cost of \$700 a bed as against nearly \$2000 a bed for the Boston Consumptives Hospital at Mattapan. The Rutland Hospital was then placed under the Trustees. Only those on the inside fully know how much of the conspicuous success of this new departure was due to the compelling wisdom and unremitting labor of Dr. Cabot. In this, as in all his other work, its quality was only matched by his



modesty. He was influential in procuring the passage of the bill requiring instruction in hygiene and preventive disease in the public schools. His counsel was sought by the General Electric Company with regard to the safeguarding and promoting the health of its employees at Lynn and Pittsfield. So deeply did he become interested in this line of work that in the spring of 1910 he retired from all practice and its emoluments that he might husband his strength for public work alone.

During about thirty years he published over one hundred and twenty papers. The last is a plea for the prevention and treatment of tuberculosis in childhood, to be found in the *Atlantic Monthly* for November, 1912. He was a member of many medical societies and of the American Academy of Arts and Sciences.

This is a meagre account of his strictly professional activities. In 1896, as has been stated before, he was chosen a member of the Corporation of Harvard College, that small body of seven which fills its own vacancies, has exclusive charge of the funds, the initiative in most appointments, and may, in a way, be compared, as regards the government of the University, to the Senate of the United States; though it has more power, relatively, to that of the lower House — the Overseers. Membership in the Corporation is no sinecure. It involves a deal of work. Questions large in variety and great in moment constantly arise and demand careful, deliberate, ripe judgment. Nobody in active professional or business life can accept the honor and the service without large sacrifice of time and strength; no physician without also loss of income. After careful consideration he accepted the election, and we saw the unprecedented occupation of two seats on the Board by physicians. The part which he and Dr. Walcott have taken in the marvelous development of the Medical School can be, in a measure, appreciated by the most matter-of-fact. They were the Building Committee on the part of the Corporation.

Dr. Cabot's feeling and love for art, always keen and discriminating, led to the Trusteeship in the Museum of Fine Arts in 1899. Here, too, he was a worker. Everywhere and always the "good enough" for him was nothing short of the best of which he was capable. In social life he was more and more sought after. He had at times a certain grimness of manner which could be raised to the nth power by anything mean, petty or under-handed. This grimness concealed more or less to the casual acquaintance the steady glow of one of the warmest of hearts and the most lovable of natures; but abated, in a measure, as he grew older. He was sympathetically receptive, and

gave close attention to those who asked his opinion or advice. He was fond of horses and a good judge of them, played polo and rode to hounds. No form of boating was foreign to him. Tennis, golf and the like he enjoyed and played when he could get time and opportunity. His vacations were mostly spent in hunting and fishing trips from Florida to Canada, and as far as the Rockies. Shortly before his death he sold his interest in the Long Point Ducking Club, probably the best in the country, and devoted the proceeds to the purchase and maintenance of land in Canton, his legal residence, as a playground for the town.

Combining harmoniously and in a high degree intelligence, sound judgment, courage both moral and physical, sense of duty, manual dexterity and mechanical skill, he devoted his powers to the service of others, with small thought of pecuniary return. For him to give was, indeed, more blessed than to receive. He was, in truth, a noble gentleman, a conspicuous example of a man born in high social position, with means sufficient to tempt a less ardent nature to idleness, but serving only to carry him to fields of great usefulness and public service. He taught us how to live, and, again, how to face disease and death with cheerful fortitude.

He is survived by his widow, Susan, daughter and only child of the late George O. Shattuck, a leader of the Suffolk Bar.

F. C. SHATTUCK.

## CYRUS BALLOU COMSTOCK (1831-1910)

Fellow in Class I, Section 4, 1892.

General Cyrus Ballou Comstock was born in West Wrentham, Massachusetts, February 3, 1831, and represented the ninth generation of an old New England family, which came from Devonshire, England. His ancestors lived in New London, and the earliest of them in this country fought in the Pequot war, taking part in the expedition which captured the fort at Mystic in 1637. Later generations of the family lived in Rhode Island and in Massachusetts. The General's great-grandfather was a Quaker, and took no active part in the Revolution, but was a member of the Massachusetts convention which ratified the Constitution of the United States, February 7, 1788, and was also a member of the General Court of Massachusetts in 1789.

General Comstock was educated in the local public schools and at a private academy. His interest in engineering arose from his happening to see the operations and instruments of a party making a railroad survey, and also of a coast survey party. The General began his professional work as a rodman and leveler on the Providence & Worcester Railroad, but in 1851 was nominated as a candidate to West Point, and was graduated with first honors in 1855. He served through all grades in the Corps of Engineers to that of Colonel, and was retired from active service by operation of law in 1895. He was promoted to the grade of Brigadier General on the retired list in 1904.

General Comstock, after serving on the construction of fortifications before the Civil War, and as Professor of Natural Philosophy at West Point from 1859 to 1861, was, during the Civil War, engaged in the construction of the defences of Washington, and in service on the engineering staff of the Army of the Potomac, of which he was Chief Engineer. He was present, under General Grant, at the siege of Vicksburg, and in 1864 was appointed Aide-de-camp to General Grant, being engaged in a number of the most sanguinary battles of the war. During the war he received rapid promotion, and attained the rank of Major in the Corps of Engineers, and Brevet Brigadier General.

General Comstock's principal work after the war was in the conduct of the geodetic survey of the Great Lakes, which had been inaugurated in 1841. This work was conducted with all the precision necessary to

determine not only the topography and hydrography of the region, but also to be of geodetic value. The measurements were made with extreme accuracy, involving eight primary base lines, a primary triangulation about 1650 miles in length, and a hydrographic survey covering nearly 10,000 square miles, and also the investigation of the earth's magnetism. His report on this great work, published as Professional Paper No. 24 of the Corps of Engineers, in 1882, is a document of great value and permanent interest to geodesists, and is a monument to his professional ability and that of his associates.

General Comstock was also engaged in studies relating to the improvement of rivers and deltas, and was sent to Europe to investigate these subjects. He served on several boards, and was Superintending Engineer to examine the progress of jetties built by Captain Eads at the mouth of the Mississippi. He was a member of the Mississippi River commission for 16 years, and its President for five years, during which time he had to deal with many difficult hydraulic problems. He was also a member of the permanent Board of Engineers for fortifications and river and harbor improvements, and commanded the Engineer School of Application at Willets Point, New York, for about a year.

General Comstock was a member of the National Academy of Sciences, to which he donated a trust fund to be devoted to researches in electricity, magnetism and radiant energy, the value of which subjects his own experience had led him to appreciate. He became a member of the American Academy of Arts and Sciences in 1892.

In addition to his classic report on the Lake survey, General Comstock's name appears as a signer of the reports of sixty local engineering boards, of twenty-one of which he was President. His life furnished a good illustration of the value of science to the professional engineer, and of the value of the engineer to science.<sup>1</sup> He died at New York City, May 29, 1910.

G. F. SWAIN.

---

<sup>1</sup> This memoir is abstracted from a longer memoir of General Comstock by General Henry L. Abbot, in the annual of the association of graduates of the United States Military Academy, in 1912.

## JAMES MASON CRAFTS (1839-1917)

Fellow in Class I, Section 3, 1897.

The passing of another from among the few survivors of the older generation of leading chemists arouses sorrow for our great loss and gratitude for his devoted labor. Among the honored names of American scientific men of the 19th century that of Professor Crafts will always be remembered. Both in the direction of organic chemistry and in that of physical chemistry he rendered contributions of great permanent value.

James Mason Crafts was born at Boston on March 8, 1839. He was the son of Royal Altamont Crafts and Marianne (Mason) Crafts. He is remembered by his schoolmates at the Sullivan School in Boston as a serious boy, but one glowing with vigor and at times full of fun and jollity. The most vivid impression was of his mechanical ingenuity and dexterity: he was able at the age of nine or ten to pull to pieces and successfully reassemble his watch — a rare possession in those days among school children. All his childhood was spent in Boston, where he completed at the Boston Latin School and under the private tuition of Dr. Samuel Eliot the excellent training in mathematics with which he entered the then recently founded Lawrence Scientific School of Harvard University in 1856. At Harvard he pursued the study of chemistry under Professor Horsford, and graduated with the degree of S. B. in 1858.

The winter of 1858-59 he spent as a graduate student of engineering at Cambridge, whence he went to the Bergakademie at Freiberg in Saxony to continue once more the study of the science to which he was to devote his lifework. In 1860 he migrated to the University of Heidelberg, where he studied under Robert W. Bunsen, at that time and for many years afterwards director of the chemical laboratory there. In the following year the young chemist left Germany for Paris, where he came under the influence of Wurtz, and for four years continued his studies at the École de Médecine. Ever afterwards his interest centered in France rather than in Germany.

Returning to America in 1865 he became mine examiner in Mexico during 1866-1867 — a task which involved courage and resourcefulness as well as expert knowledge, since the country was alive with bandits and filled with difficulties. His adventures were thrilling,

but he told of them very modestly. In the following autumn (1867) he became professor of chemistry and dean of the chemical faculty at Cornell University, a position which he retained for three years. From Ithaca he was called to the professorship at the Massachusetts Institute of Technology as successor to Professor F. H. Storer. He devoted himself to the work, and his health suffered. The call of France was insistent, and changing in 1874 his title to that of non-resident professor at the Massachusetts Institute, he turned again to Paris, where, in collaboration with Professor Charles Friedel, he discovered the important organic reaction which will always bear his name. After 1880, when he resigned even the non-resident professorship at the Massachusetts Institute, he spent most of the succeeding decade in France, and it was not until 1891 that he returned to America as a permanent abiding place. Then he once more became connected with the Institute in Boston, conducting research there, and for five years (1892-97) filling the chairmanship of the chemical department and the professorship of organic chemistry. His work as a teacher was inspiring and effective. From October, 1897 to 1900 he was first acting president and then president of this great technical school. After his resignation of the presidency, which offered a sort of work never entirely to his taste, he returned to the labors which really claimed his interest, namely, research in the direction of organic and physical chemistry, still doing part of his work in the old Walker building of the Institute near Copley Square. He worked for the love of science, not for fame or money, and his ample means never led him away from high aims and solid attainments.

His noteworthy contributions to the sum of human knowledge gained for him recognition on all sides. In 1885 he received the Jecker prize of the Paris Academy of Sciences, and was made Chevalier of the Legion of Honor of France. In 1898 he was awarded the honorary degree of LL.D. by Harvard University, and in 1911 the Rumford Medal by this Academy "for his researches in high temperature thermometry and the exact determination of fixed points on the thermometric scale." He was first elected a fellow of the Academy in 1867 and was reelected to resident membership in 1891 after an interval of non-membership due to his prolonged absence in France. As long ago as 1872 he became a member of the National Academy of Sciences, and was later corresponding member of the British Association for the Advancement of Science, foreign member of the Royal Institution of Great Britain (1904) as well as fellow of many other learned academies and chemical societies. He was a member also of the Saturday Club of Boston, famous in the annals of American literature.

On June 13, 1868, he married Miss Clemence Haggerty of New York, who died in 1912. He is survived by four daughters: Mrs. Russell S. Codman, Mrs. Gordon K. Bell, Miss Elizabeth Crafts and Miss Clemence Crafts.

Although much of a traveler during the early part of his life, toward the end he divided his time between his Boston residence on Commonwealth Avenue and his beautiful country place at Ridgefield, Connecticut, where he had a small laboratory well fitted for his work, and where he enjoyed quiet and seclusion, always more to his taste than publicity or the whirl of city life. He retained his vigorous mental powers to the end, although somewhat restricted in physical activity by illness during his last few years. His well-rounded and useful life of over seventy-eight years came to an end at Ridgefield on June 20, 1917, when he succumbed to a sudden, painful illness of the heart.

As already stated, his scientific work divides itself naturally into two groups of researches, namely, those in organic and those in physical chemistry. His earliest published contributions to knowledge concerned the organic compounds of silicon, upon which he published an interesting and important paper in 1865. This was followed by work upon the arsenic and arsenious esters, which appeared in 1871. Six years afterwards, with Professor Charles Friedel, he published in volume 84 of the *Comptes Rendus* the first notice of the method of organic synthesis by means of the chloride of aluminum, which has had such a remarkable effect upon the growth of organic chemistry. In the succeeding years paper after paper from these two eminent collaborators appeared, amplifying their great discovery. In 1880 Professor Crafts's work upon accurate thermometry showing the peculiar hysteresis effects in glass, which must be considered in any accurate determination of temperature by the mercury thermometer, began to appear. At about this time also he published valuable papers in collaboration with Professor Friedel and others concerning vapor densities of the halogens at high temperatures.

His work on thermometry led to the determination of new fixed points to which the thermometric scale might be referred; and his study of the boiling points of naphthalene and of mercury attained a degree of accuracy little short of amazing, considering the state of these matters before they had come under the scrutiny of his insight and patient experimentation. Later in Boston, from 1900 almost to the time of his death, he devoted himself to chemical research, especially to the study of organic catalytic reactions in concentrated solutions, feeling that such reactions had not received the attention which

was their due. At the same time he spent much time and thought on the construction of an exceedingly accurate barometer, by means of which he could measure atmospheric pressure with great precision and thus obtain yet more accurate values for the boiling points of various substances which should serve as standards.

In viewing collectively the outcome of Professor Crafts's varied work, one may note that much of it, both physical and organic, had as its object the providing of means and methods for further advance, of use to others in many fields. Those whose labor is lightened, broadened, and simplified by the important contributions of his scientific imagination and of his persistent, effective research in the laboratory are deeply grateful for the indispensable aid which he rendered, and will be, far into the future. His intimates mourn a generous, loyal, high-minded friend, whose vigorous intellect always turned toward worthy ends.

THEODORE W. RICHARDS.

EDMONDO DE AMICIS (1846-1908)

Foreign Honorary Member in Class III, Section 4, 1901.

Edmondo De Amicis was born at Oneglia, a little town on the sea-coast southeast of Genoa, October 21, 1846. Having attended school at Cuneo and Turin, he went to the Military Academy at Modena, from which in 1865, he was appointed Second Lieutenant of the Third Regiment of the Line. The following year he took part in the Battle of Custoza. In 1867 he became managing editor of *Italia Militare*, an important military journal published at Florence. To this he contributed many sketches of the life actually lived by Italian soldiers and officers, and when these were reprinted in a volume with the title "La Vita Militare" in 1868, they gave him an immediate popularity which went on widening until his death. They had also real influence in improving the conditions of the soldiers, by moderating the harshness of their discipline, a harshness then common in European armies. De Amicis continued to edit the Journal for some time and he remained in the Italian army until 1871. He was present when Cadorna's troops entered by the Porta Pia and freed Rome from Papal rule September 20, 1870. After resigning from the service he devoted himself to literature, making Turin his headquarters and he was, with



two or three exceptions, probably the only Italian writer of that time whose works had so wide a circulation as to bring him a livelihood. They were of three kinds: first, fiction, including under this head several novels and his very realistic sketches; second, descriptions of his travels; and third, poems. His books of travel made him known outside of Italy and were translated into several languages. The earliest, on Spain, appeared in 1873; Holland in 1874; Constantinople, 1877; Morocco, 1879; Argentina, to which he gave the title "Sull' Oceano" in 1877; besides recollections of London and of Paris. In his later years he became like Lombroso and other intellectuals at Turin and Milan, a socialist, and he issued several volumes in support of this cult. He interested himself in writing for the young and his "Cuore," of which more than 400,000 copies had already been sold several years ago, aims at teaching the young, (through a story which has enchanted them by multitudes), the elements of a strong and noble character. No other book in modern Italian, except Manzoni's "I Promessi Sposi" has been so popular. He wrote also, "L'Idioma Gentile" which glorifies the Italian language; and, besides several polemical tracts and later recollections, he produced more fiction, of which "Il Romanzo d'un Maestro" was the most important. He died at Turin, March 12, 1908. De Amicis was a remarkably clear writer, a master of vivid description, and he possessed an indefinable charm which endeared him to most of his readers and diffused a magnetic quality over whatever he wrote.

WILLIAM ROSCOE THAYER.

WILLIAM WATSON GOODWIN (1831-1912)

Fellow in Class III, Section 2, 1859 (President 1903-1908).

William Watson Goodwin died in Cambridge, June 15, 1912. He was elected Fellow of the Academy, January 26, 1859, was a member of the Publication Committee from 1871 to 1880, and President from 1903 to 1908, in which year his failing health compelled him to decline re-election. His interest in the Academy was shown by frequent addresses and by letters when he was in Europe. His last communication was an interesting description of the character of the meetings in his early years (*Proceedings*, vol. XLVI, 1910).

The son of Hersey Bradford Goodwin (Harvard College 1826, Harvard Divinity School 1829) and Lucretia Ann Watson, he was born May 9, 1831, at Concord, Mass., where his father was the colleague of the Senior Minister, Dr. Ezra Ripley. Both his parents having died during his infancy, he lived at Plymouth with his grandmother, Lucretia Burr (Sturges) Watson until he entered Harvard College in 1847. After receiving his Bachelor's degree in 1851 he lived in Cambridge for two years as resident graduate taking a few private pupils, (among others John C. Ropes), but devoting the major part of his time to the pursuit of his own studies in company with Ephraim Whitman Gurney and Henry Williamson Haynes. Finding, however, that there was no opportunity for advanced study at Harvard (the Graduate Department was unknown until 1872), he determined to seek instruction in Göttingen, which had been the resort of many Harvard men, such as Everett, Bancroft, Longfellow, Motley, and, nearer his own day, Gould, '44, and Child and Lane (both '46), with whom he was to be so long associated in Cambridge. He used to recall with interest the fact that of the five holders of the Eliot Professorship of Greek Literature, since its foundation, three had studied at the Georgia-Augusta. The great classical scholars there in his day were Schneidewin and K. F. Hermann, the latter the last of the encyclopaedists in classical philology. After studying in Göttingen, Bonn, and Berlin for two years, he received the degree of Ph.D. from Göttingen in 1855. His doctor's dissertation dealt with the Sea Power of the Ancients ("De potentiae veterum gentium maritimae epochis apud Eusebium"). During his stay abroad he visited Italy and Greece.

Returning in 1856, Goodwin found that he had been made Tutor in Greek and Latin at Harvard, a post he exchanged, in the following year, for that of Tutor in Greek. In 1860, he succeeded Felton, who, in that year, resigned the Eliot Professorship of Greek Literature to become President of the College. For forty-one years Goodwin was in active service; even after his resignation in 1901, when he became *Emeritus*, his zeal did not permit him to sever himself from the work of actual instruction, and for seven years he continued to lecture on Plato and Aristotle. From 1903 to 1909 he was Overseer of the University, a distinction attained by relatively few of its teachers.

In the history of education in America few men have exceeded Goodwin's period of service; and few have conferred greater distinction on American scholarship. His life is no exception to the rule that the annals of a scholar's career are short and simple. His many years

were spent in unremitting and unobtrusive labor for the welfare of Harvard in a period fruitful in far-reaching changes, a period that witnessed the decline of the old type of American college and the rise of the American university. He was clear-sighted in his judgment and temperate in his reasoning alike when he advocated, or when he opposed, the policies that shaped the conduct of Harvard University to its present estate.

The controlling motive that directed him during the revolutionary changes that transformed the Harvard of his youth was the welfare of scholarship, not merely in the Classics, but in every other discipline as well. He opposed the reduction of the college course from four years to three years because he believed that any reduction should be made at the beginning, not at the end; and he never changed his opinion as to the importance of classical study as a basis of literary culture. He was ingenuously dismayed at the failure of some of his contemporaries to see the value of Greek for modern education; and he witnessed with regret a generation of youth invited, as it were, to aim at literary culture without a knowledge of the language of Homer, Sophocles, and Plato. But if he could not view untroubled the dissolution of all the old ideas as to the value of a "liberal" education, he never wished for the return of the system of required studies prevalent in his undergraduate days and still in force until 1867-68; he advocated the abandoning of obligatory Greek in the Sophomore year; he welcomed the advent of the more fully developed elective system, though he foresaw some of the defects it has disclosed. He was not a blind worshipper of the classical literature of the ancients; he saw in it, not an agent for the discipline of the intellect of all youth, but an instrument, imperative for the understanding of the development of European letters, and salutary for those who would win a true appreciation of English literature. In him the intellectual spirit of scientific research in the field of grammar did not blunt the literary and artistic sense, which, as has well been said, is partly also moral. The old-time humanities translated themselves in him into the spirit of just and refined living. He did not confine his sympathies to the ancient world that was his by the association of daily work; but he realized, in the words of Renan, that "progress will eternally consist in developing what Greece conceived"; and from Greece he gathered, what many of the noblest and best have gathered thence, a large part of that wisdom of life which is more precious and more enduring than mere learning.

As a teacher, as I recall him in the late seventies, Goodwin insisted

on rigid accuracy in the understanding of the words of the text as the approach to the larger understanding of the thought — the only true method, if a vapid sentimental enthusiasm is not to be the goal of the appreciation of Greek, or of any other, literature. He laid no special emphasis on formal grammar, but he had taken to heart, perhaps unconsciously, the saying of Godfried Hermann, that without grammar there can be no appreciation of literature. Looseness of method Goodwin detested, and as he held us to strict accuracy, so in his range of exposition he confined himself to essentials in comment and illustration. His instruction was sound and informing, laying stress on fact rather than on subjective impressions. He managed his large store of knowledge with an ease and a security that awakened at once our admiration and our confidence. In textual criticism, as elsewhere, he abhorred supersubtle ingenuity; he permitted no difficulty or obscurity, especially in phraseology or historical allusion, to pass unexplained, but he had the sincerity to confess his inability to understand passages corrupt beyond all cure.

No one who knew Goodwin, no one who has ever listened to the sustained flow of his facile translation of the "Agamemnon," could ever doubt that he had a deep love for Greek literature. But he was temperamentally alien to panegyric; he would not allow the language of emotional appreciation to trouble the beauty, the calm, the harmony of imagination and reason that give to Greek literature its sempiternal charm. Like the very reticences of that literature, the reticence of its expositor marked his power. He appealed therefore less to the many than to those, who, like himself, needed no spur in their "chase after beauty"—if I may use Plato's phrase in another application. His formative influence may be traced in the temperate and rational style, in the absence of extravagance, exaggeration, and perverse ingenuity, in the work of many of his pupils.

It is the common fate of men who have devoted themselves with success to the welfare of a beloved college, that later generations should allow the memory of their many labors to pass into forgetfulness. As an Hellenist, however, Goodwin's name will live, for directly and indirectly, as an interpreter of the literature and language of ancient Greece, he had a large influence on the temper and conscience of classical scholarship in the United States.

In the middle of the last century our native classical scholarship had scarcely awakened to the possibility of the independence born of original research. A leisurely interest in the classics as the humanities, a somewhat torpid belief in their efficiency as a discipline for all

mental dispositions, which was tempered but rarely by incursions into the larger meanings of Hellenic literature, sufficed with but rare exceptions for the generation under which Goodwin grew to manhood. In the year when, at the age of twenty-nine, he succeeded Felton in the Eliot Professorship, Goodwin gave evidence with a certain brilliant audacity that he had severed himself from the past. The year 1860 may well be taken as the mark of the appearance of a new spirit in our classical scholarship. In that year Hadley at Yale published his "Greek Grammar" based on the work of Georg Curtius; at Harvard, Goodwin brought out the book with which his name will be longest associated — the "Syntax of the Moods and Tenses of the Greek Verb."

I cannot discover that Goodwin had occupied himself especially with the problems of systematic Greek grammar in any of its aspects during his residence at the universities of Göttingen, Bonn, and Berlin; but the "Moods and Tenses" is itself a witness to the quickening spirit exercised by European masters upon the American philologists who, about the middle of the last century, began to cross the ocean in search of the inspiration they could not find at home. Yet the work, alike in its first form and when rewritten and greatly enlarged thirty years afterwards, owes relatively little to European research for its essential distinction. Not that Goodwin was not indebted, as he himself gladly acknowledged, to the labors of the great Danish scholar Madvig, or that some of his positions had not already been occupied by German syntacticians. But at the very outset of his career he had learned to think for himself — "*Librum aperi, ut discas quid alii cogitaverint; librum claude, ut ipse cogites.*" It was due to his native and trained sense and knowledge of language as the instrument of the most delicate and refined expression that he was enabled to safeguard the subject of the modal and temporal relations of the Greek verb from the twofold danger that menaced it at the time. On the one hand, metaphysical subtlety exercised a malign influence in disturbing a clear understanding of the facts and their interpretation; on the other hand, comparative grammar, a science at that time in its infancy, by the very width of its horizon and the insecurity of its basis, threatened to carry back to the primitive home of the Aryans many of the problems that pertained in the first instance to the history of the Greek language on Greek soil.

It was Goodwin's clarity of judgment — with characteristic modesty he called it "common sense" — that saw the truth when the Germans had generally failed to release themselves from the intricacies of philo-

sophical abstractions; and with equal sagacity and discernment he refused to trust himself upon the shifting sands of comparative syntax. The metaphysical syntax that held sway when Goodwin began his career is largely a thing of the past; but historical syntax, both in the wider area of the Indo-European languages and on Greek territory, has immeasurably increased its influence as it has steadily built upon securer foundations.

The wonder is that after thirty years the large increments of scientific research should have found themselves easily at home and should have worked no disturbance to the principles laid down in a book, of which its author, in his revision of 1890, said that it had appeared "in the enthusiasm of youth as an ephemeral production." The truth is that the "Moods and Tenses" of 1890 is at bottom the "Moods and Tenses" of 1860; for, though there was much to add in a work designed to fill a larger compass, there was astonishingly little to curtail, to modify in important particulars, or to reject out-right. I know of no book of like character that possesses the quality of prescience in equal degree. The "Moods and Tenses," like every other piece of work done by its author, is marked by perfect sanity, displays the working of an independent and resourceful thinker, who with steadied purpose aimed at presenting the vital principles and the essential facts, freed from the entanglements of specious and shifting theories. It is the expression of a cautious scholar who possessed a varied and exact knowledge of English speech, which he wielded with precision in setting forth the fine distinctions of the delicate Greek idiom. To its judicious presentation of the facts, to its lucidity and exactness of statement, perhaps even to its very refusal to enter at all points and at all hazards upon the treacherous ground of absolute definition, the book owes its fame as a standard work, still indispensable, despite the subsequent mass of treatises, both large and small, that traverse the whole or some part of the same field. And it has had a wider and more salutary influence than any American or English book in its province for more than half a century.

Apart from its virtues of lucidity and orderliness, there are certain special features of the "Moods and Tenses" that have commanded most attention: the distinction between the time of an action and the character of an action, the distinction between absolute and relative time, the division of conditional sentences (and in particular the treatment of *shall* and *will* and *should* and *would* conditions, which Goodwin discussed at some length in the *Transactions of the American Philological Association*, Vol. 7 (1876), and in the *Journal of Philology*, Vol. 8

(1879)), the relation of the optative to the subjunctive and other moods, and the origin of the construction of *οὐ μὴ* with the subjunctive and the future indicative.

The author of the "Mood and Tenses," the *doctor irrefragabilis* of Greek syntax, as he has been called, would have been the last to claim that he had, with Browning's grammarian, settled all of "*ὄτι*'s business." He had not been, like Tom Steady in "The Idler," "a vehement assertor of uncontroverted truths; and by keeping himself out of the reach of contradiction, had acquired all the confidence which the consciousness of irresistible abilities could have given." There is much in Greek syntax that is debatable territory; but whenever Goodwin entered that territory — though he was not a statistician, as the earlier great scholars were not — his prevailing soundness of judgment and his range of illustration afford the controversialist only rarely the luxury of holding a different opinion.

Goodwin's "Greek Grammar" appeared ten years after the "Moods and Tenses," and inherited as by right the distinction and the distinctive features of the earlier work. The "Moods and Tenses" appealed to the advanced student and the teacher; the "Grammar" brought before the neophyte the facts of the language in exact and clear form; and showed that its author possessed the rare (and often underestimated) faculty of making a good elementary book. Only he who has himself followed in the tracks of Goodwin can adequately realize the clarity and compactness of his statements that never err through undue emphasis either on logical or on aesthetic relations.

The very excellence and success of Goodwin's work in the department of grammar made the wider public, and to a certain degree even the Hellenists of this country, ignorant of the scope and the distinction of his work in other fields. It is an altogether erroneous notion that Goodwin was purely a grammarian, honorable as that title has been made by many illustrious scholars. The range of his sympathies with Greek literature was indicated early in his career. The "Greek Grammar" appeared in 1870; in the same year was published Goodwin's revision, in five volumes, of the translation of Plutarch's "Morals" made by various hands in the seventeenth century. Innumerable errors and infelicities of the old translation were cleared away by Goodwin, whose work was termed a "vindication" of Plutarch by Emerson, who contributed an Introduction to the revision. English readers who would acquaint themselves with the deep and broad humanity of the sage of Chaeronea, in whom the intellect was illuminated by the force of morals, will long continue to use the translation of the Cambridge scholar.



In common with many men of his position Goodwin turned at times to editorial work of a humbler character. He re-edited Felton's edition of Isocrates' "Panegyricus" (1863), of the "Birds" (1868) and the "Clouds" (1870) of Aristophanes. One of the most excellent books of its kind is the "Greek Reader" (1877, and in many later editions), while his edition of the "Anabasis" (1885, and in many later editions), prepared in conjunction with his colleague, Professor J. W. White, and augmented by an Illustrated Vocabulary, the work of Professors White and Morgan, is a model for its exact attention to grammatical details.

With Greek philosophy Goodwin never claimed the intimate acquaintance of one whose special interests and sympathies mark him as a philosopher by profession. The temper of his mind was not metaphysical. Yet he had a large knowledge of the great ethical books of Greek literature, and years of close study made him a wise and judicious interpreter of the "Republic" of Plato and of Aristotle's "Ethics." To the investigation of the history, antiquities, and law of ancient Greece he brought a mind keenly observant of the similarities and differences between ancient and modern times. It is in the interpretation of the masterpiece of Greek oratory that the scholar must be able to draw, in well-nigh equal measure, upon a sound knowledge of ancient history and ancient law. Goodwin's mastery of this double field appears in his editions of Demosthenes' "On the Crown" (1901) and "Against Midias" (1906). He wrote also on "The Relation of the *πρόεδροι* to the *πρωτάγεις* in the Athenian Senate," and on "The Value of the Attic Talent in Modern Money" (*Transactions of the American Philological Association*, Vol. 16, 1885). To Thucydides he devoted a large share of his attention, and for many years lectured also on certain masterpieces of the Greek drama.

It is to be regretted that Goodwin would not allow himself to be persuaded to prepare an edition of Aeschylus, to the interpretation of whose text he devoted years of profound study. He edited the text and prepared a translation of the "Agamemnon," to be used in connection with the public presentation of that play by the Department of Classics at Harvard in 1906. Of his critical method we have a luminous example in the paper entitled "On the Text and Interpretation of certain passages in the Agamemnon of Aeschylus." (*Transactions Amer. Philol. Assoc.*, Vol. 8, 1877). In confronting the great difficulties of the text of Aeschylus, Goodwin was invariably hostile to the sciolist who complacently substitutes his emendations for the words of the poet. "Est quaedam etiam nesciendi ars et scientia"—an



admonition applied far more rigorously by the American scholar than by its German author.

It was Goodwin's good fortune to visit Greece as a young man when fresh from his studies in Germany; and it was he who was the first Director of the American School of Classical Studies at Athens (1882-83), an appropriate honor for the foremost Greek scholar of his time who was also one of the founders of the American Institute of Archaeology. To his acquaintance with the land of Greece, reinforcing his knowledge of Greek literature and history, we owe the admirable paper on "The Battle of Salamis," first published in 1885 (*Papers of the American School of Classical Studies in Athens*, vol. I); and in another form in 1906 (*Harvard Studies in Classical Philology*, vol. XVII). Goodwin's careful sifting of the evidence determined the several localities in question and convincingly described the dispositions and movements of the Greek and barbarian forces in connection with that memorable contest. During his sojourn in Greece he became intimate with Prime Minister Tricoupis and long continued in association with the family of that statesman. His interest in the land of Greece was fittingly signalized by his being named a Knight of the Greek Order of the Redeemer.

Apart from the books and separate articles already mentioned, Goodwin wrote relatively little. He contributed to "The Christian Register" an appreciation of Jowett which deals sympathetically with the "Essays and Reviews"; he prepared memoirs of Professors Torrey and Lane, and communicated to the Massachusetts Historical Society the Records of the Old Colony Club (1769-1773). In 1896, when the Venezuelan dispute was in the air, he sent to the *Crimson* a vigorous reply to Roosevelt's letter in the same journal branding as unpatriotic a Harvard protest against the war-policy of the national executive and national legislature. But of all his writings not dealing with things Greek, the most admirable in its tone and farthest-reaching in its influence is the address "On the Present and Future of Harvard College," delivered before Phi Beta Kappa in 1891. It commands attention for its description of the standards of the College in his undergraduate days and for its temperate discussion of the elective system, which in his view had immeasurably raised the scholarship of the studious though it had possibly dulled the high personal enthusiasm that marked the ambitious three generations ago. But, above all, the address is invaluable for its analysis of the relation between liberal and professional studies and for its expression of Goodwin's profound loyalty and affection for his College, which, "like a queen,

can do no wrong," though her ministers may err, and which, "has more than an imperial treasury in the love and respect of her sons and in the confidence of the community."

His life was bound up with the interests of Harvard, with which he was connected, as student or as officer, for fifty-six years. Long before he reached an advanced age he delighted in reminiscence, in tales of the simplicity of college life in the fifties, and not the least part of his charm for those of the younger generation who had a lively interest in Harvard's past, consisted in the inexhaustible (and now irrecoverable) fund of anecdotes about early academic worthies — and unworthies — that lay in the memory of one who had been a student under Everett and Sparks and an officer of the college during the administrations of Walker, Felton, Hill and Eliot. Harvard has had few sons who have displayed greater devotion than he; a devotion that he was able to signalize by the foundation of a Scholarship in memory of his son Charles Haven, whose career of promise was cut short by his death one year after his graduation in 1888; and, at the end, by a bequest sufficient to establish one of the best endowed Scholarships in the bestowal of the University.

To the cause of the higher education of women Goodwin gave his influential support. He was one of the first of the few teachers of Harvard who were early encouraged to try the experiment of giving instruction to advanced women students; and for many years he continued to make certain of his courses accessible to members of Radcliffe. He was one of the incorporators of the Society for the Collegiate Instruction of Women and afterward of Radcliffe College, served on the Academic Board of the Annex from 1882 to 1893, was Chairman of that Board in 1885-86, a member of the Council of Radcliffe College from 1888 to 1911, and a member of the Associates of Radcliffe College from its incorporation until his death.

Such are the landmarks in the career of a scholar whose life was spent in quiet devotion to high things, a life that made no parade and sought none of the noisy ways of fame. Yet to few Americans of our time has been given an ampler measure of the tribute of recognition that great powers have been used effectively and serviceably. Goodwin's mastery of Greek syntax enfranchised in Great Britain the Hellenic scholarship of the United States. The "Moods and Tenses" became there, as at home, a standard treatise; the *Journal of Philology* and Liddell and Scott's *Greek Lexicon* contain further evidences of his exact learning. He received the degree of LL.D. from Cambridge in 1883, from Edinburgh in 1890, and the degree of D. C. L. from

Oxford also in 1890. In 1905 Göttingen renewed *honoris causa* the degree of Ph.D. which he had received at that University in 1855. At home he received honorary degrees from Amherst, Chicago, Columbia, Yale, and Harvard. He enjoyed the rare distinction of being twice president of the American Philological Association (1871 and 1884); he was vice-president of the Egypt Exploration Fund; for many years he was closely identified with the work of the Archaeological Institute of America. He was a member of the American Philosophical Society, an honorary member of the Hellenic Society of London, of the Philological Society of Cambridge, England, of the Hellenic Society of Constantinople, of the Archaeological Society and Academy of Science at Athens, and a foreign member of the Imperial German Archaeological Institute.

Like the "high-minded man" of Aristotle, praise or blame neither elated nor dejected him. He was unfeignedly modest, and always took for himself far less than he deserved. He knew much about things of which he professed to know nothing. Laudation of his work did not cause him to think unduly of his powers, and he could rejoice in siding with a critic against himself, the mark (according to Emerson) of the cultured man. He kept unimpaired the serenity of the scholar whose only aim is the truth and who sinks his personality in his work. He was no lover of controversy and indirect challenge did not provoke him to break silence. He never strove to be eloquent or subtle. Disingenuousness was utterly foreign to him. His every spoken and written word was as clear and simple and straightforward as his life.

Not that he made his deeper self familiar even to his friends. Reserve warded off the aggression of emotion in others as it was his defence against its promptings in himself; but, like some undemonstrative natures, he had a large capacity for tenderness. He had none of the latent unsociability of the typical scholar, but was averse to "talking shop," when many would gladly have had him yield to that academic temptation. He delighted in the offices of an unostentatious and refined hospitality; he seasoned life with humor and keen wit. At the public dinner in 1901 in commemoration of his retirement he proposed to amend Solon's maxim "call no man happy till he is dead" to "call no man happy till he resigns." He relished the dry humor of the descendants of the Pilgrims at Plymouth, and matched their aphorisms with those of the ancients. His sayings about people often had a quaint and humorous acidity, but they were never prompted by ungenerous feeling. No one could pass the barrier of his aloofness

and come really to know him without loving him for the warmth of his heart, his sympathy and his never-failing kindness.

The large influence enjoyed by Goodwin was not due merely to his profound scholarship and solid achievements, nor to the fact that he was the embodiment of Greek culture, nor yet because to the younger generation he was the representative of an older time and had clothed himself with the wisdom of long experience. His influence was due above all to his high personal distinction. To his intellectual vigor and broad culture he united a noble temper, energy in repose, and a character that commanded respect and veneration. He measured the efficiency of his college by an exalted standard of scholarship; he was just and fair and broad-minded; never disabling his judgment by surrendering it to the caprices of momentary feeling; his character retained the sterling qualities of his Pilgrim ancestry while it had been softened to a gracious gentleness by the temper of his culture and a cosmopolitanism that had made him conversant with many lands and many men of distinction. But, more than all this, his whole life bore witness to purity and loftiness of soul. And his beautiful face and noble bearing affirmed the inner man — in very truth *καλὸς καὶ ἀγαθὸς ἀνὴρ*.

HERBERT WEIR SMYTH.

#### EDWARD HENRY HALL (1831-1912)

Fellow in Class III, Section 4, 1907.

Edward Henry Hall was born in Cincinnati, Ohio, April 16, 1831, and died in Cambridge, Massachusetts, February 22, 1912. He was son of Edward Brooks Hall (Harv. A. B. 1820, S. T. D. '48) and Harriet Ware Hall, daughter of Henry Ware, Sr., Hollis Professor of Divinity 1805-1845 (emeritus after 1840). After graduating from Harvard College in 1851, and from the Divinity School in 1855, he was ordained minister of the First Church in Plymouth on January 5, 1859, where he remained until July 1867, with an interruption from September 12, 1862 to June 18, 1863, during which he served as chaplain of the 44th Inf. M. V. M. From February 10, 1869 to February 26, 1882, he was minister of the Second Congregational Church of Worcester, and from March 30, 1882 to March 31, 1893 of

the First Parish and Church in Cambridge. He was also Lecturer on the History of Christian Doctrine in the Harvard Divinity School, 1899-1900. In 1902 Harvard conferred upon him the honorary degree of S. T. D. as, in the apt phrases of President Eliot, "army chaplain in the Civil War, pastor, preacher, candid student of early Christian history, independent outspoken citizen."

Dr. Hall was a conspicuous example of the clerical type once prevalent here in New England but now rapidly disappearing. Abhorring sensationalism and sentimentalism, he maintained the most exigent ideals of personal and civic righteousness, intellectual integrity and personal honor. Utterly fearless, and with the sincerity and simplicity which accompany courage at its best, he spoke out his full mind on theological and social topics. Severely aristocratic in his tastes and pleasures, with a native dignity superior to all baseness and a fine contempt for sham and pretence, which he was keen to detect, he was also thoroughly democratic in social principles and mental attitude. There was a significant difference between his appearance on foot and on horseback. Walking the streets of Cambridge, often accompanied by his dog, he would have attracted little attention from a casual passer-by unless, indeed, the raising of his head to acknowledge the greetings of a friend had given a glimpse of his keen, strong, intellectual face, but when he rode, erect and martial, he was a distinguished figure of whom no one could have failed to take notice. As a scholar, he was interested in Christian History, particularly in the earlier period. In this field his work was conscientiously thorough and accurate, but the "enthusiasm" of the early church, and particularly of Paul, was so alien to his own habits of mind and life, as to make sympathetic appreciation difficult and hence he never quite succeeded in making its scenes and characters live. The title of his last book "Paul the Apostle, as viewed by a Layman" was significant of his devotion to the ideals of Congregationalism according to which a clergyman, as such, has no existence apart from his relation to the particular church of which he is minister. From this point of view, Dr. Hall, having resigned his Cambridge pastorate, properly and consistently described himself as a layman.

His published works are:—

Orthodoxy and Heresy in the Christian Church—Worcester (privately printed) 1874; Boston, American Unitarian Association, 1883.

First Lessons on the Bible—Boston, Unitarian Sunday School Society, 1882.

Lessons on the Life of Paul — Boston, Unitarian Sunday School Society, 1885.

Discourses — Boston, George H. Ellis, 1893.

Papias and his Contemporaries — Boston and New York, Houghton, Mifflin & Co., 1899.

Paul the Apostle, as viewed by a Layman — Boston, Little, Brown & Co., 1906.

W. W. FENN.

#### WILLIAM WIRT HOWE (1833-1909)

Fellow in Class III, Section 1, 1900.

William Wirt Howe was born at Canandaigua, New York, on November 24, 1833. He was of English descent, an ancestor having come to America from Warwickshire about 1630. After graduating from Hamilton College in 1853 he studied law in St. Louis and began to practise there, but attracted by the greater opportunities in the East soon moved to New York City. At the outbreak of the civil war he gave up his profession for service in defense of the Union and became a Lieutenant in the 7th Kansas Volunteers. Throughout the war he was continuously engaged in military duty and rose to the rank of Major. In 1862 he was married at Utica, New York, to Frances A. Gridley.

At the end of the war Mr. Howe established himself in New Orleans and resumed the practise of the law. He was appointed by General Sheridan during the latter's military administration under the Reconstruction Act as judge of the principal Criminal Court in New Orleans, and in 1868 was appointed by Governor Warmoth to the Supreme Court of Louisiana, a position which he held until 1873. In 1900 he was appointed by President McKinley, United States District Attorney for the Eastern District of Louisiana; he was reappointed by President Roosevelt and served until in 1907 failing health compelled his resignation. In 1909 Judge Howe died at the age of seventy-six. He left a widow and one son, Wirt Howe, a graduate of Harvard University and of the Harvard Law School.

In his profession Judge Howe achieved success and a reputation for character as well as for capacity that was rewarded by his election

in 1907 to the presidency of the American Bar Association of which he had become a member in 1881, three years after its organization. In his profession too he was recognized as a lecturer of exceptional ability and delivered courses of lectures at the St. Louis Law School, the Law Schools of the University of the South, Boston University, the University of Pennsylvania and Columbia University. At Yale University he delivered the Storr's series of lectures and these were published in 1896 and a second edition in 1905 under the title of "Studies in the Civil Law."

Judge Howe's interests and activities were not, however, confined to the law. For four years he was president of the New Orleans civil service board, receiving his appointment from the mayor of the city. He served as president of the Louisiana Historical Association and published a Municipal History of New Orleans, a Monograph of Johns Hopkins and a life of Francois Xavier Martin, for more than thirty years a judge of the Supreme Court of Louisiana and known as the "Father of Louisiana Jurisprudence." Always prominent in philanthropic and public enterprises Judge Howe was one of the incorporators and at his death a trustee of the Eye, Ear and Nose Hospital; one of the original members of the Louisiana Association for the Prevention of Cruelty to Animals; administrator of the Charitable Hospital of New Orleans; treasurer of Tulane University; an incorporator and first president of the New Orleans Art Association; an active member of the New Orleans Chamber of Commerce and Board of Trade; for thirty-four years senior warden of Christ Church Cathedral, and a trustee of the Carnegie Institution in Washington.

Settling in New Orleans immediately after the civil war in which he himself had taken an active part on the Northern side, Judge Howe began his career in a hostile community. The stormy years of reconstruction followed. A Northerner and a republican, he could not look with favor on the reestablishment of the old slaveholding aristocracy, and he received his judicial appointments from the republican party. But whatever sympathy he may have felt with the original aspirations of the radical republicans who for five or six years were supported by the federal government and maintained a precarious rule only through the use of federal troops, he revolted from the carnival of extravagance, dishonesty and corruption that marked the period of republican control. He was not one of the infamous horde of carpet baggers who after the war invaded the South intent only on loot, and, seeking to enrich themselves at the expense of an impoverished and distracted people, greatly aggravated the difficulties,



sufficiently great under the best circumstances, of the race problem. When Judge Howe settled in New Orleans it was with no desire to exploit the South but with the purpose of becoming a permanent resident and of doing his part as he would have done it elsewhere for the public good. Long before his service as a judge of the Supreme Court ended it had been demonstrated that continuance of the negro republican rule meant the ruin of Louisiana. Judge Howe, like other good citizens, rallied to the support of Francis T. Nicholls and the men who with him were struggling to save the state from further spoliation and degradation, and without renouncing his political faith worked patriotically for redemption of the city and the state.

It is seldom that any man starting life afresh at over thirty years of age in a new environment, almost an alien in race, under the handicap of most violent political and social prejudices, achieves success. Judge Howe faced all these conditions. Probably no community in the South felt a greater bitterness towards the North than did New Orleans at the end of the war. This bitterness was increased ten fold by the experiences of the reconstruction period. Yet Judge Howe succeeded in overcoming the obstacles. First appointed to public office by a hated military commander and later to a higher judicial office by an equally hated republican governor, he so won the esteem of political opponents and enemies as to be selected by a staunch democrat and ex-confederate soldier for a position of honor and responsibility as administrator of the Charity Hospital, and long before his death had become, as the roll of offices of trust and honor which he held shows, one of the leading citizens of his adopted state.

The secret of Judge Howe's success was character. Those thrown into association with him could not fail to recognize the cultured gentleman, the public spirited citizen, and the loyal friend and associate. Political advancement, if he desired it, he could not expect in Louisiana, without apostasy to his republican convictions. But once the political atmosphere was cleared so that men judged their fellows by other than political tests his integrity, ability and high standards earned for him the respect and the confidence of his neighbors in New Orleans, as they earned for him national recognition. His election to the presidency of the American Bar Association stamped him as a fit representative of the South in his chosen profession; his appointment as a trustee of the Carnegie Institution showed that his reputation as a wise and responsible administrator had become more than local.

An interesting and amusing conversationalist, of ready wit, with a



store of dry humor and a mind well stocked with reading, study and travel, he was much in demand for both public and private entertainments and filled with distinction a social position seldom attained in a city like New Orleans by one coming from without.

Judge Howe's work upon the Supreme bench of Louisiana showed courage, learning and conscientious discharge of his duties. He dared in a strong dissenting opinion to declare against the constitutionality of a state law which denied to one who in good faith had purchased for value a note originally given for the price of a slave the right to recover on the note. But the times were not favorable for any great judicial career in Louisiana, and the practice of the court which did not favor long opinions makes the reports of his decisions for the most part little more than a record of the conclusions reached. On the bench and in his subsequent career Judge Howe acquired a deserved distinction as a capable judge, an able counsellor and an effective lecturer. He lacked perhaps the attainments that would warrant calling him a great jurist, a great advocate or a great teacher. But if he fell short of the highest professional rank, his diversified interests, his large public spirit, the traits which won him the respect and esteem of the community and the affection of numerous friends, fully entitle him to be written down as "one who loved his fellow men" — and served them well.

WILLIAM H. DUNBAR.

#### LEONARD PARKER KINNICUTT (1854-1911)

Fellow in Class I, Section 3, 1883.

Leonard Parker Kinnicutt<sup>1</sup> was born in Worcester, May 22, 1854, the son of Francis H. and Elizabeth Waldo (Parker) Kinnicutt. He received his early education in the schools of Worcester, graduating from the high school in 1871. He went at once to the Massachusetts Institute of Technology, where he devoted himself chiefly to the study of chemistry. Following his graduation in 1875 he spent four years in professional studies in Germany. At Heidelberg he came under

---

<sup>1</sup> This sketch was published by the writer in *Science* April 28, 1911.

the inspiring influence of Bunsen from whom he acquired an appreciation of the value of careful and accurate analysis. Here also under Bunsen's guidance he was initiated into the refinements of gas analysis. This was the period when organic chemistry was developing with tremendous rapidity especially in Germany. Bunsen had passed the zenith of his career and was not in sympathy with the new tendency which was manifesting itself in chemistry. It is not surprising then to find the young Kinnicutt leaving Heidelberg and matriculating at Bonn. Only ten years before, Kekulé had been called to the University of Bonn to take charge of the newly built laboratory which at that time was the finest in all Germany and after which later laboratories were patterned. Kekulé's was a charming personality. His lectures were a model for simplicity of arrangement and clearness of presentation, and the experimental demonstrations were carried out with such fascinating ease and dexterity that the young Kinnicutt was captivated by the spirit and beauty of organic chemistry and devoted himself diligently to its study.

He was fortunate in being accepted into the private laboratory of the master, where he became associated with Richard Anschütz, the present director of the Chemical Institute at Bonn. In collaboration with Anschütz he published a number of papers, chiefly on phenylglyceric acid. This association ripened into a lasting friendship. Returning to the United States in 1879, he spent a year in study with Ira Remsen at the Johns Hopkins University, and then three years at Harvard, where he served as instructor in quantitative analysis and as private assistant to Wolcott Gibbs, at that time Rumford Professor of Chemistry. In 1882 he received from Harvard the degree of doctor of science and in September of the same year accepted an appointment as instructor of organic chemistry at the Worcester Polytechnic Institute. In the following January he became assistant professor of chemistry; three years later he was made full professor, and from 1892 was director of the department.

As early as 1885 Professor Kinnicutt began to give attention to the question of sewage disposal and sanitary problems. He became an authority on the sanitation of air, water and gas; on the methods of analysis and on the disposal of wastes. He paid particular attention to the examination of water and watersheds and the contamination of rivers and ponds by trade wastes and sewage. He made numerous reports, both as regards private and public water supplies.

He visited England on an average every other year since 1894, familiarizing himself with the work done in that country and the results were embodied in various articles which he published on the

subject. He paid special attention to the subject of the pollution of streams by wool-washings, and made a careful study of this problem at Bradford, England, where a greater amount of wool is washed annually than in any other city in England or in this country.

He was employed as an expert in numerous cases regarding the pollution of streams and ponds, and was one of the experts in the case of the pollution of the Mississippi River at St. Louis by the sewage of Chicago. In 1903 he was appointed consulting chemist of the Connecticut Sewage Commission, a position which he retained up to the time of his death. He was a frequent contributor to scientific periodicals and the proceedings of learned societies upon topics relating to his specialty.

In 1910 in collaboration with Professor C. E. A. Winslow, of the Massachusetts Institute of Technology, and Mr. R. Winthrop Pratt, of the Ohio State Board of Health, he published a book entitled "Sewage Disposal" which is considered to be one of the best treatises on the subject of sewage disposal in the English language.

Professor Kinnicutt's reputation was not confined to this country. He enjoyed a wide acquaintance, both in England and on the continent, and possessed the rare faculty of keeping ever fresh and active a friendship once established. One of his highest honors was the appointment as president of the Section of Hygiene of the International Congress of Applied Chemistry, which was held in Washington and New York in September, 1912. Even to within a few days of his death he continued to work with characteristic zeal in perfecting plans for the success of the section over which he was to have presided. Professor Kinnicutt was deeply interested in the sanitary problems of his native city, Worcester. He kept a careful watch upon the city's water supply. During the "water famine" of the winter of 1910 to 1911 he directed from his sick bed the tests to be made, had daily reports brought to him and outlined the policy by which, in his opinion, the city's health might be best safeguarded.

He devoted a great deal of time and money to secure a pure milk supply in summer for the babies in needy families, and at the time of his death he was a member of the Worcester Medical Milk Commission. Professor Kinnicutt was widely connected with scientific associations; he was a fellow of the American Academy of Arts and Sciences, an active member of the C. M. Warren Committee from its foundation in 1893 and its chairman from 1903 to his death; a fellow of the American Association for the Advancement of Science, of which he was vice-president in 1904; a member of the American Chemical Society, and councillor for a succession of years; a member of the

Society of Bacteriology; a fellow of the New England Water Works Association; of the Boston Society of Civil Engineers; of the American Antiquarian Society, and of various foreign associations, including the Association of Managers of Sewage Disposal Works of England, the London Chemical Society, and the German Chemical Society. He was a member of several social clubs in Worcester and Boston and retained to a remarkable degree his interest in the alumni reunions of the Massachusetts Institute of Technology, of the John Hopkins University and of Harvard University, and he rarely failed to be present and add his geniality to the general good cheer.

Esteemed and honored by the scientific world, and beloved by a wide circle of acquaintances, yet it was as a teacher that the true worth of his character manifested itself. Possessed of a broad training and knowledge of his subject, and a fund of personal experiences, with which he punctuated his lectures, he was enabled to drive home the truths which he desired to impress on the minds of his students. Interest in his students, however, did not cease with the lecture or the laboratory. He was ever ready to listen sympathizingly and indulgently to those students who were in distress, and to all such he gave liberally of his time and purse. This conscientious devotion to duty and unselfish human interest endeared him to the students and alumni. It came as a great shock to all when, after a delightful summer of European travel and the resumption of his academic duties, apparently in his usual good health, he was attacked by a slow fever which confined him to the house after but a few days of activity. The trouble was diagnosed finally as tuberculosis. He received his first warning that he had this insidious disease in his system when he was a student in Germany, but had apparently fully recovered from this earlier attack. It was hoped that a year's leave of absence and careful nursing would restore him to health and the resumption of a part at least of his former activities. Toward the end of January, 1911, however, his heart became seriously affected, and he failed rapidly until the end came peacefully on the morning of the sixth of February.

Professor William T. Sedgwick, a lifelong friend paid a fitting tribute to his memory when he said, "His was a unique, lovable and altogether charming personality. Kindness and friendship such as his life exemplified could no further go. He was critical, yet just; fearless, yet considerate of others; honest to a fault; a hard worker; and to a degree nowadays unusual, an accomplished and cultivated gentleman."

W. L. JENNINGS.

## ROBERT KOCH (1843-1910)

Foreign Honorary Member in Class II, Section 4, 1901.

Robert Koch died May 27, 1910, in his sixty-seventh year. He was born in Klaustal; was one of thirteen children; eleven sons and two daughters.

He was at first intended to be a tradesman, but later was allowed to carry out his own desire, which was to study medicine.

In April, 1862, at the age of eighteen, he entered the University of Göttingen, and devoted himself to the study of mathematics, physics and botany. The physiologist, Meissner, and the pathologist, Henle had a special influence upon him during his stay here. In his second semester, he was made an assistant in the Pathological Museum, and shortly after took an academic prize.

In January, 1866, he took his Doctor's examination in Göttingen, and in March of the same year, after a short stay in Berlin, passed his state examination with great distinction at Hanover. He then spent a month as an assistant in the General Hospital of Hamburg, and from October, 1866 to July, 1868, combined general practice with that of physician to the Idiot's Hospital of Langenhagen near Hanover. He then practised a short time in Neimegk in Brandenburg, and from 1869 in Rakwitz in the province of Posen. From Rakwitz he went as a volunteer surgeon to the war against France; returning home — at the suggestion of one of his friends, he passed the examination for, and until 1872 served as, District Physician in Wollstein near Rakwitz.

In spite of all the interruptions that come to a busy practitioner, Koch had found time for microscopic studies during the preceding years, but it was first in Wollstein that, thanks to his improved financial condition, he secured better apparatus and instruments and could control his time better. He cut off half his consulting room for a laboratory, in which was installed a photomicrographic apparatus and a dark room. It was in this room that the young District Physician and busy practitioner made the discoveries that stamped him as a master of knowledge. The aims of his life stood now clear before his eyes. He threw a search-light on the darkness surrounding the infectious diseases: he placed the old, much disputed doctrine of

contagium vivum upon a solid foundation, and showed the methods of attack and control of pestilences.

The opportunity offered itself, at this time, to study anthrax, which formed the subject of his first recorded and published paper: ("Die Ätiologie der Milzbrandkrankheit, begründet auf die Entwicklungsgeschichte des *Bacillus anthracis*," Cohn's *Beiträge z. Biologie der Pflanzen*, II, 1876, 1 Pl.) This was the first of the series of papers upon this disease: studies which involved him in the bitter controversy with Pasteur. Before this was finished, came his special contributions on methods ("Verfahung zur Untersuchung, zum Konservieren und Photographieren der Bakterien," Cohn's *Beiträge*, II, 1877, and "Zur Untersuchung von pathogenen organismen," *Mitt. a. d. Kais. Gesundheitsamte*, I, Berlin, 1881). Then came his work on suppurations and septicemias ("Untersuchung über die Ätiologie der Wundinfektionskrankheiten," Leipzig, 1878) on disinfection ("Über Desinfektion," *Mitt. a. d. Kais. Gesund.*, I, Berlin, 1881), and his results on tuberculosis, first indicated in 1882 ("Die Ätiologie der Tuberkulose. Nach einen in der Physiologische Gesellschaft zu Berlin am 24. März, 1882, gehaltenen Vortrage," *Berlin, Klin. Woch.* 1882," and "Die Ätiologie der Tuberkulose," *Mitt. a. d. Kais. Gesund.*, II, Berlin, 1884.) This subject took much of his attention for many years, and as his demonstration of the etiological factor served to give his reputation the solid world-wide acceptance that it received, so the forced circumstances surrounding the announcement of the remedial substance "tuberculin," and the disappointment of the extreme hopes aroused, served to embitter much of his later life. The circumstances of this occurrence are tragic, as those familiar with the facts well know. In 1882, however, his work on tuberculosis was interrupted by the expedition to Egypt and India for the study of cholera. The results appeared in 1887 in a separate volume (*Arb. a. d. Kais. Gesundheitsamt*, 1887, III), and like all his previous communications bear the marks of painstaking research and great accuracy.

His work on "infectious-wound-diseases" especially aroused Cohn's interest, so that through his influence, Koch became District Physician in Breslau in 1879. But his reputation was so rapidly growing that on June 28, 1880, he was brought to the Kaiserlichen Gesundheitsamt in Berlin, and was at last free to work and carry out his great aims uninterrupted. It was here that he perfected his methods of staining, of photomicrography, and of solid culture media — all of them used before, but not widely known and accepted — methods that form the base of much of our knowledge of microscopic organisms, and the perfecting of which is in itself a claim to great distinction.

In 1885 a new promotion came — to the Chair of Professor of Hygiene in the Medical Faculty of the University of Berlin, and Director of the newly established Hygienic Institute.

In June, 1891, he was again transferred — to become the head of the new Institute for Infectious Diseases, with a hospital attached. In this place he became the leader and director of campaigns against epidemics in all parts of the Empire. He was made Surgeon-General of the Health Service, and Professor and Fellow of the Science Senate of the Kaiser Wilhelm's Academy.

As early as 1881, he had suggested that other micro-organisms than bacteria might be the cause of some infectious processes, and that blood-sucking insects might easily be the intermediate hosts. This he later demonstrated in his work in India, New Guinea and Africa upon many of the infections there prevalent.

Koch's characteristics were those necessary for the successful investigator — patience, a strong will and great persistence. The earlier part of his career was marked by such definite and clear-cut results in all his published papers that the scientific world was ready to accept the claims attributed to him as to the effects to be expected from the use of tuberculin. His personality was modest and unassuming, his diction, in conversation, simple, clear and convincing. These qualities seem to have been lessened in later life, for there then appears a tendency to general and dogmatic statement, and a greater inclination to controversial methods than had been seen before. Nevertheless, second only to Pasteur, his career stands as one of the first importance in the advance of our knowledge of the infectious diseases and the relief of human suffering.

H. C. ERNST.

## SAMUEL PIERPONT LANGLEY (1834-1906)

Fellow in Class I, Section 2, 1883.

What can a writer of a notice of Samuel Pierpont Langley, twelve years after his death, add to the notices already published in the leading scientific societies of the world: especially the full notices at the memorial meeting in the Smithsonian Institution, Dec. 3, 1906? The American Academy of Arts and Sciences, however, would feel that it would be lacking in respect to the memory of one of its most distinguished members if it did not commemorate, even in a brief note, his achievements. The American Academy early recognized his ability by the bestowal of the Rumford medals; and it can now point with pride to the justification of their confidence in the value of his work.

Samuel Pierpont Langley was born in Roxbury, Mass., Aug. 22, 1834. He was educated in the Boston Latin School and in the Boston High School. Having adopted the profession of an architect and a civil engineer, he went to the West and engaged for a time in practical life; but his scientific tastes prevailed and he came back to the east to take up the study of astronomy. He became an assistant in the Harvard College Observatory, and at the age of thirty-two was appointed Director of the Allegheny Observatory, where he remained for twenty years.

He became a pioneer in the new subject of astrophysics and soon began a series of investigations on radiant energy, especially manifested in the solar spectrum. In his early experiments he used the apparatus made classical by previous investigators — the combination of junctions of bismuth and antimony, called the Melloni pile. These junctions are very sensitive to radiant heat, and the thermo-electric currents developed at the junctions can be measured by a suitable instrument — a galvanometer — placed in an electric circuit — namely the circuit of the junctions and the galvanometer. Langley found, as so many did, that thermo-electricity cannot be depended upon for accuracy of indications of small amounts of heat. He therefore adopted the electric balance, in which the increase of electrical resistance in a coil submitted to heat, is balanced by other coils. The electrical balance is what is known as the Wheatstone's Bridge. Langley's contribution to the electrical balance was the use of an



excessively fine metallic filament for the resistance submitted to radiant energy. This filament responded to extraordinarily small increments of heat. I well remember his enthusiasm, when on a visit to Cambridge, he showed me the modification of the balance which he called a bolometer and said "I have found a means of overcoming all my difficulties." A new instrument often marks the beginning of a new epoch in science, Langley opened a great field of investigation in that portion of the solar spectrum which extends into darkness beyond the visible red — the portion called the infra red; and mapped lines and absorption bands in a region eight to ten times the extent of the visible spectrum.

With his bolometer he undertook an investigation of the heat of the moon; but could not distinguish between the heat given off by the body of the moon and that due to reflection of the sun's rays. He made journeys to Mt. Whitney where the height and steadiness of the atmosphere promised to enable him to determine the constancy of the radiation of the sun. He laid the foundation of the subsequent refined measurements of Dr. Abbot. When Langley was called to the Smithsonian, as Director he founded an astrophysical observatory in connection with the Institution which has become renowned as a centre of investigation of radiant energy.

Langley obtained by his investigations with the bolometer an enduring place in the history of science which, however, was to be greatly increased by his later work on the aeroplane. My acquaintance with him began on a camping out expedition in Maine. He impressed me as a man wrapped in heavy thought. One evening Professor Alfred M. Mayer, who was of the party, expressed the conviction that a scientific man could acquire in half an hour the practical experience which had taken our guide twenty years to obtain; and he and Langley took lessons in paddling a canoe. There was no wind and the lake, on the shores of which we were encamped was placid. Langley, taking with him a copy of Maxwell's Matter and Motion, paddled across the lake. A thunder cloud presently arose and Langley endeavored to return; but there was no stone in the bow of the canoe; and it did not occur to him to shift his position to the middle of the canoe. He had to summon the guide. Later we were together in London, and on one occasion while riding in the suburbs, he broke a moody silence by remarking, "How absurd it is to be carried by this horse — a mass of flesh and bones, nine hundred pounds in weight, I have an engine, which weighs only four pounds and develops two horse power."

When the idea of flying possessed him he went ahead without regard to the universal ridicule which greeted those who believed that flying was possible—a ridicule fully expressed by the poem, "Darius Green and his flying machine," and was constantly showing his friends little devices, modifications of boomerangs, arrangements of wings and screws which showed marvellous capabilities of flight. Finally in 1896 he constructed a machine which was driven by a small steam engine and which flew down the Potomac a distance of over a mile. The machine was set off on a car which ran forward on ways, and which fell down at the extremity of the car's motion, releasing the aeroplane for its flight.

In 1898 a board consisting of army and navy officers was appointed to investigate Langley's experiments. Their report was favorable and the board allotted \$50,000 for the development and construction of a large aeroplane. A difficulty was met in obtaining a suitable light engine and suitable materials for the guys and wings. In 1901 a gasoline engine was secured and work proceeded. The first machine weighed 830 pounds and had a surface of 1,040 square feet. The entire power plant weighed less than 5 pounds to the horse power. The successful small mechanical model which made the flight of a mile, weighed 58 pounds, had a surface of 66 square feet and an engine which developed  $2\frac{1}{2}$  to 3 horse power. The same launching apparatus which had worked successfully in the case of the small model was prepared for the large machine. The weather conditions on the Potomac were most baffling. It seemed as if the winds followed the course of the river and Langley, with hope deferred must have suffered great perturbation of spirit in studying the weather conditions. There seemed to be a malevolence in nature; which we feel in war times. A small house had been erected on the banks of the Potomac and the launching ways carefully tested. On October 7, 1903, in the presence of a curious throng of spectators the conditions of the atmosphere seemed propitious. The engineer took his seat and the car with the aeroplane sped down the ways. Just as it left the track, with the 50 horse power engine whirling the propellor, one of the guys was caught by the falling ways, a front guy post was also caught. The front of the machine was dragged downwards and the machine plunged into the water about 50 yards in front of the boathouse.

After some repairs a second attempt was made on December 8, 1903, with a resulting disaster. The rear guy post seemed to drag, bringing the rudder down on the launching ways with a crashing rending sound and a collapse of the rear wings. The machine was

wrecked and the funds, exhausted. Langley said, "Failure in the aerodrome itself, in its engines there had been none: and it is believed that it is at the moment of success, and when the engineering problems have been solved, a lack of means has prevented a continuance of the work." If he had only thought of mounting his aeroplane on bicycle wheels! what a small thing prevented his success. One recalls the canoe episode on the Maine lake. I know of no more touching episode in the history of invention. He had success in his grasp. A critic has said that he ought to have stopped with his mechanical model; for he had not the engineering skill to perfect his invention. It seems to me that this is not true. Langley combined with his theoretical knowledge of mechanics a remarkable practical skill. His aeroplane afterwards flew. Perhaps he underated the necessity of practical experience in balancing even after a successful launching. With what exultation of spirit he would survey today the progress of aviation. It is one of the unintelligible things in this life that this exultation was denied him; for he was a man especially fond of distinction. He failed for the want of a few thousand dollars; and the United States Government is now appropriating millions for aeroplanes. In the Smithsonian Miscellaneous Collections for 1907, will be found a complete bibliography of Langley's papers. It contains 284 references.

JOHN TROWBRIDGE.

THOMAS RAYNESFORD LOUNSBURY (1838-1915)

Fellow in Class III, Section 2, 1896.

I

Thomas Raynesford Lounsbury, son of Thomas and Mary Janette (Woodward) Lounsbury, was born on January 1st, 1838, at Ovid, New York, where his father was pastor of the Presbyterian Church. At the age of seventeen he entered Yale College; he took his degree in 1859. His undergraduate career was distinguished by sundry prizes and other such recognitions of literary propensities. After graduation he was for some time employed on the not too mature staff engaged in preparing Appleton's New American Cyclopaedia. From 1862 to 1865 he served as an infantry officer in the Civil War,

during the latter part of this time as Adjutant of the Draft Rendezvous at Elmira, New York, which was also a depot for Confederate prisoners. The next five years he passed in school teaching, private tutoring, and eager study, particularly of the English language and literature. In 1870 he returned to Yale, as instructor in English at the Sheffield Scientific School; the next year he was made professor of English there. As such he continued his work, scholar and teacher alike, for thirty-five years, retiring in 1906. He died at New Haven, on April 9th, 1915.

For a long time he had then been recognized not only as one who will hardly be forgotten among the worthies of Yale but as a scholar of national and international importance — after the death of Professor Child, of Harvard, in 1896, undisputedly the most eminent master of his subject in the United States. This eminence was attested by many degrees and similar honors. He was Doctor of Laws of Yale, of Harvard, and of Aberdeen; he was Doctor of Letters of Princeton; and, to go no further, he was from the first a member of the American Academy of Arts and Letters. He had been made a Fellow of the American Academy of Arts and Sciences April 8, 1896.

Apart from occasional writing, his publications were not precocious. The first which he chose to record in *Who's Who* was a compact handbook concerning the History of the English Language, published so late as 1879. In 1882 — though it bears the date of the following year — appeared his *Life of James Fenimore Cooper*, in the American Men of Letters Series. In 1891 came what is generally thought his most important work, the three-volume *Studies in Chaucer*, affectionately dedicated to Professor Child. Between 1901 and 1906 came the three volumes which he grouped together under the title of *Shakespearean Wars: Shakespeare as a Dramatic Artist, Shakespeare and Voltaire, and The Text of Shakespeare*. Meanwhile, in 1904, he had extended into a small volume papers originally written for occasional purposes, concerning *The Standard of Pronunciation in English*. This was followed in 1908 by a similar but rather more extensive book on *The Standard of Usage in English*. In 1909, he completed this third of his trilogies by his book on *English Spelling and Spelling Reform*. In 1911 appeared his four lectures, originally given at the University of Virginia, on the *Early Literary Career of Robert Browning*; in 1912 followed that most compact and satisfactory of anthologies, *The Yale Book of American Verse*. His last considerable publication was posthumous: *The Life and Times of Tennyson (From 1809 to 1850)* he had left unfinished; in December, 1915, only eight

months after his death, it was printed under the supervision of his junior colleague and devoted friend, Professor Wilbur Cross.

In 1871, Professor Lounsbury married Jane, daughter of General Thomas J. Folwell, of New York. With one son, she survived him.

## II

It is happily characteristic of Professor Lounsbury that when he retired from the drudgery of teaching, in 1906, a neighbor more than twenty years younger than he sent the Yale Alumni Weekly a column touching on the humanity of him just as a neighbor. There have rarely been men more stoutly themselves; but you could hardly meet him, even occasionally and casually, without a contagious sense of human fellowship. As one thinks of him now, the first thought is that he was of the few who can unwittingly help fellow beings to be better fellows. His appearance was by no means academic; rather his burly vigor bespoke the old soldier. So late as 1915, when he was more than seventy-five years old, he allowed to stand in *Who's Who* the statement that his favorite recreations were cycling and tennis. A tall man and a large, sandy-haired and bearded, with heavy-lidded eyes which troubled him in his later years, he might have looked ponderous, if he had been less alert. He was voluble yet affable; whether you talked back to him or not, you felt as if you did. His boundless range of information was always at his command. He had the buoyant potency of a great scholar; he could master books and they could not master him. No man was ever more free from the insidious bonds of pedantry. Life is real, books are the record of past realities; to understand books we must take them for what they truly are — the data from which imagination can revive aspects of life no longer visible to living men. Your pedant stops at the letter, imprisoned in the walls of his library; your scholar finds his library an open gate to worlds he can never explore too eagerly. He loves his path, no doubt, but mostly because it is the way to boundless journeys of discovery; and discovery is discovery, be it of a new flower or of a new continent or planet. We may seem to be straying from a life which passed half its allotted span in the teaching of boys at an American Scientific School; yet those who remember Professor Lounsbury can hardly help, from the very force of his memory, starting away from daily commonplace.

How tremendously commonplace the circumstances of his professional work must have been, anyone who has taught undergraduates

must sadly know. The independence of Professor Lounsbury's nature kept him apart from the rigid curriculum which persisted at Yale College during the greater part of his teaching years. In the Scientific School he was more free to deal with his still new and somewhat suspected subject of English than he could have been in the college itself; but this very freedom brought its penalties. Students of science, at least in his time, have been so largely because they would not take the trouble to make themselves students of the humanities; and students of English, as a class, have been so largely for the reason that they could thus dispense with the vexatious need of learning any other language than their own. Until very late in Professor Lounsbury's career as a teacher, there was little graduate study of English at Yale: even now, your graduate student of English anywhere is seldom inspiring. So perhaps only men who have had to teach English at a Yankee college can fully enjoy two of his remembered comments on this task. The first is in his life of Cooper (p. 7), who was for a while an undergraduate at Yale. "We need not feel any distrust," writes Lounsbury, "of his declaration that little learning of any kind forced its way into his head. Least of all will he be inclined to doubt it whom extended experience in the class-room has taught to view with profoundest respect the infinite capability of the human mind to resist the introduction of knowledge." The second of his comments on pupils, though perhaps legendary, is at once equally characteristic and more familiar. Towards the close of an unusually restless hour, he is said to have admonished his class in some such words as these: "You must stay with me a little longer. I have a few more pearls to cast before you."

And pearls they were, those words of his, whether they concerned learning or sport, reminiscence or what a less robust nature would have found the benumbing chill of college conservatism. He was a Yale man to the core, and lived to be in his later years among the most secure of Yale worthies in the hearts of men that loved Yale. The way in which he instinctively combined simplicity with distinction breathed the best spirit of the college which was his from boyhood to the last. He was a born and a trained lover of literature. Above all, though, he was a pitiless enemy of literary cant; he never forgot the supreme truth of fact; and no one ever sought or asserted fact with more sturdy common-sense. Before his time, the teaching of English at Yale had been mostly concerned with formal rhetoric and oratory. His own first teaching directed the attention of his pupils straight to the texts of Shakespeare, of Milton, of Dryden, and of

Pope — poets who have survived so surely that, whether you care for them or not, their works are touchstones by which those who will may test the worth of works lesser or newer. And what he thought of the trivial conventions of petty literary grace may be gathered from the saying attributed to him by Professor Cross, that "a man who hasn't brains enough to write a grammar writes a rhetoric."

Those who knew Professor Lounsbury, even though slightly, can never forget him. No one can remember him without interest, few without affection.

### III

Whoever, with such memory, turns now to the books where he has left his record for future times must feel, more than usual, how little books, even though deeply characteristic, can preserve the atmosphere of a memorable personality. Something similar is true of two Harvard worthies — Lowell and Norton. Lowell's poems and essays are securely placed among the standards of literature in America, Norton's books and letters are lasting records of the most gracious American culture. But Harvard men who studied under Lowell or Norton, or who know them as they lived and moved in the Cambridge they had seen transformed from a unique college town to populous suburban commonplace, grow impatient of their printed utterance. This is doubtless good; but the men themselves were so much better that the sense of their loss grows heavier with each page. Lounsbury's books are as characteristic as either of theirs — not least for his disdainful disregard of conventional literary pretension. He wrote, as he talked, volubly and idiomatically. He did not attempt to make literature; he was content to know it, to love it, to assert the standards of it and to maintain them with all the power of his insatiable study and of his unswerving common-sense. No man ever had a sounder appreciation of literary and poetic values; none could insist on them more sanely or more valiantly. When he came to discussing them, however, he was a little too apt to take them for granted. This, as one reflects, was evident in his talk. There one felt nothing to seek; if he strayed a bit from things themselves worth while to things about them, a word or two would recall him to the heart of the matter; oftener, gladly yielding to the sweep of his utterance, one was content for the moment to take for granted with him that there was no need to dwell on what we all knew anyway. The pitiless impersonality of print, however, reveals too clearly this error, if indeed it be not a foible, of his strength.



A shrewd contemporary of his, at another college, was apt to say that books are alive, that books about books are anaemic, and that books about books about books are still-born. In his writing as in his talk Lounsbury was red-blooded and always animated. As one turns the pages of his volumes, though, one sometimes suspects that the greatest wonder of all about him is that he could manage to make a constant impression of vigor in works which may so nearly be generalized as books about books about books.

This is not the case throughout, to be sure. His little handbook on the English Language, compact from the conditions of its limits, states the facts as they were ascertained in 1879 so firmly and with such animation that after forty years it still seems an authority. His *Life of Cooper* is an excellent piece of literary biography, where you may find not only faithful portraiture set in veracious historic background, and supplemented by compact critical comment, but now and again pearls of such water as that which we took from its setting a little while ago. His *Studies in Chaucer*, generally deemed his principal work, may justly be called diffuse and disorderly; but, for all their voluble vagrancies, they unquestionably accomplish the essential task of books about books. They make you eager to read the poet they concern, impatient again to open his pages which they irradiate with countless gleams of new light, and above all aware of what manner of human being that poet was, the greatest gentleman who ever made English poetry. When we come to Lounsbury's second trilogy, however, which has to do with Shakespeare, the case is different. Shakespeare lurks in the background; the foreground is full of faintly reanimated folks who between his time and ours have had opinions about him. The tireless erudition displayed throughout is beyond compare; Lounsbury read more extinct criticism, you grow to feel, than would have seemed within the range of human power. What is more, his own vigor gives his statements about this forgotten stuff a semblance of animation. But, after all, discussions of such things as the *Unities* and as *Eighteenth Century Views* do not lead you into the heart of Hamlet or of *The Tempest*; and if Voltaire had done nothing but first praise and then jealously blame the greatest of English poets we should trouble ourselves no more about Voltaire; and when it comes to *The Text of Shakespeare*, the matter leads us rather to the murky depths of the *Dunciad* than either to anything Pope lives by or a bit to the poetry with which Theobald dealt so faithfully as to rouse Pope's hateful spite. Lounsbury's Virginia lectures on the early career of Browning, too, tell you not so much



about Browning as about what critics thought of him. And Lounsbury's unfinished study of Tennyson leaves on your mind more distinct notions of English reviewing before 1850 than of either the poetry or the poets with whom the reviewers concerned themselves. Your notions of Tennyson himself meanwhile grow rather hazier than clearer, and in the end you are not eager to clear them up.

On the whole, *The Yale Book of American Verse* gives one the best notion of how admirable the critical sense of Lounsbury really was. There are some thirty-five pages of discursive introduction, nowhere more sturdily his own than where he touches on our national hymns, the *Star-Spangled Banner* and *America* (pp. xlii-xliv). There are some five hundred and fifty pages of selections from American verse, beginning with a hymn by Timothy Dwight (1752-1817) and ending with two longish poems by William Vaughn Moody (1869-1910). The pages are admirably printed and widely spaced. As should always be the case with poetry, they tempt the eye to linger and the mind to read at leisure; and, as there are extracts, sometimes rather long, from the work of fifty-two nineteenth century poets, there is not too much of anybody. The very mention of our national hymns, and of the names which open and close the selections, is enough to remind us that these range widely in point both of quality and of renown. The two sure things about the book are first that whoever knows our national characteristics cannot help feeling it admirably and comprehensively American, and secondly that it demonstrates as hardly ever before the merit of poetry in nineteenth century America. Thus dealing directly with literature, Lounsbury could surely make others know afresh what literature is.

His disdain of conventional rhetoric somewhat obscures this power. Professor Cross, in his pious introduction to the posthumous volume on Tennyson, draws a touching picture of Lounsbury, in his later years and with sadly weakened eyes, writing in the dark, and carefully considering the turn of his phrase. Except for incessant clearness, one would hardly suspect from his published work that he could ever have been haunted by any such artistic conscience as is here implied. In general his style seems carelessly diffuse; and his passion for the neuter pronoun was almost unholy. To take a casual example of this, he was capable of writing and of leaving unchanged in his proof such a sentence as "It is equally evident that it is Shakespeare's practice which is the one followed upon the modern stage" (*Shakespeare as a Dramatic Artist*, p. 13). Amid the very pages blurred with these rhetorical inadvertences, however, you will constantly

find passages to prove that if he had chosen he might have been a master of style. Here are two or three, taken at random as one reads. Writing of Chaucer's character of the Knight, he closed a paragraph thus: "He must be a man of honor, he must be a man of courage, above all, he must be a gentleman in his feelings, his instincts, his aspirations. He might be stupid; it was incumbent upon him to be chivalrous. If his virtues were heroic, his vices accordingly had to be of the same stamp. They must be of a bold and open sort. The knight could be licentious and arrogant and even cruel; the thing forbidden him was to be petty and mean and false." (Studies in Chaucer, II, 481-2). Again, he could summarize Warton's opinion of Chaucer in words like these: "In his eyes Chaucer was a Goth — a Goth of genius, to be sure — but still a Goth. Being a Goth, he had not the severe self-restraint of the moderns, their chastity of diction, their propriety of manner; in fine, their Art." (Studies in Chaucer, III, 250). Better still, when touching on an edition of Chaucer once projected by Samuel Johnson, he thus concludes, "Scholarship suffered no loss by the failure to carry out a scheme which was probably never more than vaguely thought about. Literary criticism certainly has. An edition of Chaucer by Johnson could never have been an authority, but it would always have proved an entertainment." (Studies in Chaucer, I, 299). You must search far and long to find criticism or parody better than that.

Another feature of his learned books bespeaks if not literary conscience at least literary instinct. One may fairly doubt whether any other American scholar of the nineteenth century was capable of disfiguring so few pages with footnotes. On general principles, everybody would probably agree that what belongs in a book ought to be there and that what does not belong there ought to be left out; in general practice, the Germanic passion of American scholars for annotating their own texts rivals Lounsbury's passion for the neuter pronoun. Lounsbury's repugnance for this kind of troublous cant was part of his pervasive common-sense. He carried it, indeed, almost to excess. More than once, as you read his torrents of authoritative statements, you would be glad if he had given you more references to supplement or to verify what he says. All the while, you rejoice that when he chose to say anything he said it out loud and not in the whisper of small print.

Lounsbury's third trilogy comprises his most nearly popular work. Originally written for Harper's Magazine, or other similar periodicals, his papers on Pronunciation in English, on Usage in English, and on English Spelling at once delighted the cock-sure and enraged the metic-

ulous. He expanded them into three small volumes which appeared between 1904 and 1909. In the matters of pronunciation and usage, he stood firm on the ground that the true question concerning any language still unummied is not what ought to be the case but what has been the case and what is. In the matter of spelling, his extensive reading, his knowledge of language and his impatience of pedantic pretence combined to transform his common-sense into that semblance of folly which, throughout the whole range of human activities nowadays, claims authority under the magic name of reform. So far as English spelling goes, most will agree that there has never been any long settled practice, and the practice imposed by nineteenth century proof readers is little better than nonsense. Wherefore, you may feel for once, here is a region where common-sense and general principles may unite. Perhaps so. What the reformers forget is the essential amenity of acknowledged manners — the civilizing effect of not doing a thing for the simple reason that it is not done. Good men have been known to raise a casuistical question as to whether your word of honour can fairly be held binding when honor is spelt without the *u*. The spelling-books of the nineteenth century are often condemned as training only that unimportant phase of the mind, the memory. So they do, if you are thinking only of the reasoning powers in contrast. There is another aspect of the whole question, though. To master the luxuriant unreason of modern English spelling, any child must develop to considerable degree the power of accurate observation. More than a few old-fashioned teachers are apt to believe, unreasoningly if not unreasonably, that the training thus given children has had a value beyond reason.

Not to dispute, now and then, would be not to admit the mood which Lounsbury excited and loved to excite. Throughout his books you may often find yourself reluctant to agree; and the very sturdiness of his voluble assertions may arouse a temper of denial. As he loved sport, he loved contest, for its own invigorating sake; but he was a true sportsman, he played fair. His writings, as we have said, do not express anything like the fulness of his contagious humanity, yet, as one thinks of them altogether, one cannot avoid the glad knowledge that, like his human self, these writings are strong, honest, manly, simple and masterly in their union of erudition with common-sense.

#### IV

One dare hardly hope, no doubt, that his books will long survive, except as old mile-stones in the interminable journey of scholarship.

His memory, more living now than any of his living words, must fade as those who knew him pass. Yet his life has done work which must endure. Whether he attracted or repelled, he never left indifferent those whom he influenced, and he influenced almost all who came within his range. Among the scholars and teachers who have made the study of the English language and of English Literature important in American universities, he was second only to Professor Child, his elder by half a generation. Child, like Lounsbury, may soon be little more than a name, or the shadow of a name. But the spirit of them lives and shall live so long as the language and the literature they loved and taught are studied and taught and loved.

BARRETT WENDELL.

CHARLES SEDGWICK MINOT (1852-1914.)

Fellow in Class II, Section 3, 1882.

Charles Sedgwick Minot was born in Boston, December 23, 1852. His parental home, five miles from Boston, and comprising about thirty acres, stood on the edge of the forest area which then stretched from Forest Hills on the north to the Blue Hills and the Great Ponds in Canton and Braintree on the south. The region even now, as seen from the summit of Blue Hill, is largely a low forest, most of it of second and third growth, with areas of cleared land in which are small towns and villages, with farm lands about them. There are interspersed fine villas inhabited by wealthy Bostonians, and most of the Forest is now included in the Metropolitan Park system and will be preserved. There are extensive low marshy flats, subject to overflow, along the Neponset River, and included in the forest there are large areas of swamp. Fine trees, elms, oaks, ash, beeches and pines abound in the region, but the trees in the forest areas are generally small. The flora and fauna are abundant and diversified. It is a stimulating region even now to a boy who has the capacity to see things and joy in seeing the wonder and beauty in nature. In Minot's boyhood the region must have been much wilder and hence more interesting than now. In such surroundings the boy grew up and early acquired the love of nature, the capacity of seeing, and the scientific curiosity to find out the meaning of the things he saw, which distinguished the life of the man.

He was a member of a large and well known family, with inherited wealth and distinguished in useful service. The usual course for a boy in his social class would have been to go through Harvard College and it is uncertain why he went to the Institute of Technology instead. The Institute had but recently been founded, it was just entering upon the great career which it has attained, and had the glamour of a new enterprise. At that time Minot could not have obtained in the Institute much stimulation in the study of natural science which from boyhood he had enthusiastically followed. He had already, at the age of sixteen, made his appearance in scientific literature by the description of the male of *Hesperia Metea*, a small butterfly captured in Dorchester and of especial interest because only the female of the species had been previously found. He derived probably a great stimulus from the meetings of the Boston Society of Natural History, which he regularly attended and took part in the discussions. He graduated from the Institute in 1872, at the age of twenty. The influence of the training he acquired at the Institute can be seen in his later life by the interest he had in mechanics and which led him to devise a number of laboratory instruments, among them the well known Minot microtome, which were characterized by simplicity of structure and admirable adaptation to the end in view. The microtome made it possible to cut thin serial sections of organs and is now, with slight and unimportant modifications, the instrument almost universally used for this purpose.

After graduating from the Institute he studied for a time with Agassiz, but he found the most congenial atmosphere in the laboratory of his friend, Henry Bowditch, who had returned from Europe in 1871 and established the first physiological laboratory in this country. Minot was his first research student and found in the older man both a congenial friend and an enthusiastic teacher. The period was one in which teaching in medical science with the laboratory as a basis was just beginning in this country. Previous to this the only laboratories, if they could be called such, in connection with medical schools were the dissecting rooms, and in Bowditch's laboratory the torch of science which was kindled in the ardent flame of the physiological laboratory in Leipzig burned brightly. His work with Bowditch turned his mind into channels which he afterwards followed, his early interest in form and structure being never lost, although modified by his study in physiology of the phenomena of life. In 1874 he published, in collaboration with Bowditch, a paper on the influence of anaesthetics on the vasomotor system, and in 1876 a short paper on transfusion and autotransfusion.

He went to Europe in 1873, working first at Leipzig with Ludwig in physiology, then at Paris with Ranvier in histology, and at Würzburg with Semper in zoölogy. His was not the common fleeting visit to these laboratories, but in each his stay was sufficiently long for him to become acquainted not only with the laboratory work and methods, but with the ideals which directed it. While at Leipzig under Ludwig's direction, he studied the production of  $\text{CO}_2$  in the active and resting muscle. He returned to America in 1876 and conducted an extensive series of experiments on tetanus, which was published in 1878, and in the same year received from Harvard University the degree of Doctor of Science.

In 1880 he received his first academic appointment, that of Lecturer on Embryology in the Harvard Medical School, and Instructor in Oral Pathology and Surgery in the Dental School. At that time it was unusual anywhere that instruction in a medical subject should be given by a person who had never taken the degree of Doctor of Medicine, and the appointment of Minot was a distinct break in the academic tradition. The appointment was due to the far-sighted intelligence of Mr. Eliot, who recognized the ability of Minot and desired for the Medical School the influence which a man trained in the traditions of pure science would exert on both the faculty and the students. The appointment was not welcomed in the faculty, and for a long time Minot undoubtedly suffered from his supposed deficiencies. The idea that a man teaching in a medical school should have some knowledge of disease and be able to give an added interest to the subject he teaches by pointing out the practical application of what is taught is not altogether a faulty one, for medicine, certainly for the majority of those entering into it is an art, but like all other arts founded on science. In 1883 he was advanced to the position of Instructor in Histology and Embryology, and this subject was given a satisfactory place in the curriculum, though it was a number of years before laboratory instruction in this subject was made obligatory and a definite part of the course. In the year 1887 he was advanced to the position of Assistant Professor. After the usual term of five years he was made Professor of Histology and Embryology, and when the James Stillman Professorship of Comparative Anatomy was founded he was transferred to that position. Upon the death of Doctor Dwight, in 1911, the subjects of Anatomy and Histology were placed together, and in 1912 he was made Director of the combined laboratories.

As a member of the faculty Minot was always outspoken, clear and logical. He never sought to obtain any end by suavity or the

claims of friendship. His arguments were always keen, definitely to the point in view which was strongly presented, sometimes even too much so. There is apt to be some suspicion in the minds of men when a policy advocated is too clearly presented; it is not flattering to those holding the opposite view. The general discussions in medical faculties do not suffer from clear and logical statement, and Minot's presentation of a subject was in marked contrast to that usually heard. While it often took a long time for men to agree with him, and he usually obtained what was desired, there was never a suspicion that the ends in view were personal and selfish. His active support could always be obtained for any measure looking to the betterment of instruction and the advance of scientific interest.

He was in all respects an admirable teacher; as a lecturer simple and clear, interesting, often enlivening the subject by shafts of keen humor, and in the laboratory stimulating, always insisting that the students should cultivate the faculties of independent observation and judgment. Minot was the first to introduce into the medical schools of the country the laboratory method of student instruction, and the way is never easy for the pioneer. It was a method new to the students, for the men entering the medical schools seem to acquire neither in the home, nor in the schools, nor in the colleges sufficient training in the methods of science. Minot lived to see the modest beginning of this method of teaching, which he made under most unsatisfactory conditions in the old Medical School on Grove Street, become the dominant method used alike in the pre-clinical and clinical branches.

Minot was an excellent director of a laboratory. His laboratory was always orderly, giving one entering it the impression given by a well ordered household. He devised a method of giving each student the use of a microscope by having him pay the school a small sum, which sufficed for their upkeep and renewal. He early began the collection of embryological material, the embryos being cut in serial sections and arranged in suitable and permanent steel cabinets which he devised. In the course of time this grew into an unrivalled collection, serving an admirable purpose, not only in teaching, but in research also, as is shown by the number of researches based upon the material of the collection. The collection was freely used by the other departments of the school, so that any question arising which was wholly or partly based upon the course of embryological development could be here studied on admirably preserved material. Minot gave much time and thought to the plans for his new laboratory at



the school and here first put into effect what he described as the laboratory unit. The unit of the teaching laboratory is a room for twenty-five students, provided with the essential instruments for laboratory work and under the direction of one instructor. The entire class comes together for lectures and demonstrations. The method renders it possible to extend a laboratory indefinitely without confusion, provided the necessary space and instructors are at hand. Minot had moreover an excellent business sense and made the small budget at his disposal cover a wide field.

He was a prolific writer, his most striking contributions being not in small single researches, but in more extensive publications in which he brought together and made more serviceable the accumulated knowledge of a subject. Sometimes, as in the case of his well-known Human Embryology, the work covered a large field. This large and comprehensive work, the result of ten years labor, was in no sense a compilation, but was based on his personal knowledge of facts, expanded by the knowledge contributed by others. The American edition was published in 1892 and a German edition in 1894. Of this work His, at that time the leading anatomist of Germany, says, "Minot's work is at present the fullest embryology of man which we possess, and it will retain its value as a bibliographical treasure-house even after its contents in many parts have been superseded." He early became interested in the subject of growth, the stimulus probably coming from Bowditch, who was carrying on his well known studies on the growth of school children while Minot was working in his laboratory. His first paper on the subject, 1878, was "Growth as a Function of Cells" which was quickly followed by another "On Certain Laws of Histological Differentiation" and in the same year he presented in an address "On Conditions to be Filled by a Theory of Life" an outline of his future work. There were many papers on the subject of growth and senescence, the whole being brought together in a book "The Problem of Age, Growth and Death" based on lectures at the Lowell Institute, March 1907. This work has been so well analyzed by Lewis in his Memoir that I quote from it. "Senescence and rejuvenation were studied by tabulating the weights of guinea-pigs from birth to old age, and of rabbit embryos up to the time of birth, using weight as a measure of growth. The conclusion was drawn that the fertilized ovum is endowed with an enormous power for growth, over ninety-eight per cent of which has been lost at the time of birth. The remaining two per cent is largely exhausted in infancy. Therefore he concludes that "senescence is at



its maximum in the very young stages and the rate of senescence diminishes with age." He protests against "the medical conception that age is a kind of disease," chronic and incurable, of any such nature as intestinal intoxication or arteriosclerosis. On the contrary he finds that it has a cytological cause, equally operative in the lower animals which have neither intestines or arteries and in man; and he ascribes senescence to the increase and differentiation of cytoplasm as compared with nucleoplasm.

In 1901 he proposed "the new term cytomorphosis to designate comprehensively all the structural alterations which cells, or successive generations of cells may undergo, from the earliest undifferentiated stage to their final destruction." His latest works on this subject, aptly characterized as "thoughtful and suggestive," refer to cytomorphosis as a most promising field for further study, and at the time of his death, plans had been made for careful investigations to test the validity of his cytomorphic hypothesis concerning age."

Of Minot's shorter contributions perhaps the best known is a paper, 1900, "On a hitherto unrecognized form of blood circulation in the organs of Vertebrata." Everyone was familiar with the differences in the thin walled capillaries running in the connective tissue of most organs, easily compressible, their calibre varying with the activity of the circulation, and the vessels in the liver which were wide, closely applied to the parenchyma and whose calibre cannot easily vary. He regarded such vessels not as capillaries but as sinusoids, showed their manner of development and the organs in which they were found.

Minot was greatly in demand as a giver of addresses and these cover a wide range of subjects. His style was vigorous, graceful, the subject enlivened by humor, sometimes with a little satire, and always interesting. They were collected and issued in a German translation under the title "Die Methode der Wissenschaft und andere Reden" — Jena, 1913. Altogether he has published more than one hundred and eighty notes and papers, including his addresses.

In 1912-1913 he was Harvard Exchange Professor at Berlin and Jena, and used the position largely in bringing to the attention of his German colleagues the amount and character of the contributions of American investigators. The position was very enjoyable to him, for he renewed and extended his wide acquaintanceship with the German men of Science.

Minot possessed a wide acquaintance with scientific men here and abroad; he was constant in his attendance on scientific meetings, taking part in the discussions, and occupying a prominent place in

the conduct of societies. He was at different times chosen President of the Naturalists, the Anatomists, the American Association for the Advancement of Science, and the American Academy of Arts and Sciences, and was frequently a member of the councils and of important committees. He was an active or corresponding member of many of the learned societies of Europe, and was honored with the L. L. D. of Yale, 1899, Toronto, 1904, St. Andrews University, Scotland, 1911, and Sc. D. of Oxford, 1902.

No account of Minot would be complete without some mention of his beautiful country home at Hyde Park, the region over which he must have rambled as a boy. The house was a plain one, roomy, furnished simply and in exquisite taste, and stood near the road, the land sloping away from it toward the south and west to a low lying wood, through which a small brook ran. The whole place was in keeping with Minot's character. It was well ordered in its plan and keeping. The trees he planted were properly placed, selected with care, and were fine specimens of the species. He bought a large number of seedlings of many varieties and as these grew he selected from them the finest specimens for planting. Every tree and shrub was well cared for and showed the effects of this in their health and vigorous growth. The garden, formal in design, with well kept grass paths, was at the foot of the slope, some distance from the house, and entered through a small arbor covered with climbing roses. Though formal, it was not severe and contained good specimens of the usual annuals and perennials and many rare plants. The two plants to which he gave most attention were irises and peonies, of each of which, but particularly of the latter, he had a large and rare collection. There were several hundred varieties of peonies, every plant showed intelligent care, and his system of cataloging and labelling was as simple and complete as the system in his laboratory. It was a great joy to go with him among the blooming peonies and see their beauty through his observant and well trained eyes. It is not an easy thing for an amateur gardener to obtain the prizes of the Massachusetts Horticultural Society, but Minot obtained prizes both for peonies and for the general excellence and beauty of the garden as a whole. The grounds and garden showed that highest art by which art is concealed and every plant grew and bloomed as though for the mere joy of living under conditions in all respects the best. There was a profusion of bloom from the earliest spring bulbs to the late chrysanthemums. Many of his plants had a personal history which he would delightfully relate, as having been procured under unusual conditions, or being

transferred to a more suitable situation, or having developed some uncommon and interesting characteristic. He was most generous with his plants, delighting to assist young beginners in horticulture. Through the wood along the brook there wandered a simple path, along the sides of which were many flowering plants collected from the swamps and fields, each in the situation best adapted for its growth and display; as a mass of dog toothed violets at the base of a decayed stump overgrown with moss, or a yellow mass of marsh marigolds intermingled with the beautiful though malodorous swamp cabbage.

I first became acquainted with Minot through the series of excellent articles on anatomy of the uterus and the changes associated with pregnancy, which were published in 1886 in the Handbook of the Medical Sciences, to which I also contributed. He was at all times a delightful companion, always loyal as a friend, sympathetic and helpful. He never hesitated to testify to his friendship. He was in all things generous, in helping younger men both materially and otherwise, a hospitable host, one who knew how to make a guest feel that he contributed to the pleasure of the host. He spoke well on most subjects, as an impromptu speaker thought came clearly and quickly and was expressed in simple language and without hesitation.

In June, 1889, he married Lucy Fosdick of Groton, Mass., in whom he found a sympathetic, helpful companion, and those who knew Minot will always associate her in their thoughts of him.

Science has been enriched by his life; in devising instruments which facilitated work, in teaching and inculcating good methods, in the research he personally conducted, and in his masterful method of presenting the work of others he added to the sum of knowledge and made its pursuit more profitable. He was a good patriotic citizen with high ideals of civic duty. He increased the joy of living by bringing to many people a richer and fuller sense of the beauty of living things; the world is a better place by his having lived.

In the preparation of this Memoir I have made use of the Memoirs by Frederick T. Lewis, by H. H. Donaldson, and by Charles W. Eliot.

W. T. COUNCILMAN.

## ALPHEUS SPRING PACKARD (1839-1905)

Fellow in Class II, Section 3, 1868.

Alpheus Spring Packard was born in Brunswick, Maine, on February 19, 1839, and died at his home in Providence, R. I., on February 14, 1905.

In view of the present interest in the backgrounds of American scholars it may be recorded that his grandfather Hezekiah Packard, a revolutionary soldier, received from Harvard College the degrees of A.B., A.M. and D.D. and was an able preacher, teacher and writer. The Rev. Dr. Jesse Appleton, one of the early Presidents of Bowdoin was his maternal grandfather. His father was the Professor Alpheus Spring Packard who for sixty-five years taught various classical subjects at Bowdoin, the venerable scholar to whom Longfellow addressed his "Morituri Salutamus."

Packard graduated from Bowdoin in 1861; received the degrees of A.M., Bowdoin, 1862; M.D., Bowdoin, 1864; S.B., Harvard, 1864; Ph.D., Bowdoin, 1879; LL.D., Bowdoin, 1891.

After graduation he studied under Louis Agassiz at Cambridge for three years and subsequently taught with him at the Anderson School of Natural History at Penikese. The comprehensiveness of his interests which included geology, paleontology, systematic, structural and economic zoölogy, embryology and anthropology may be said perhaps to have been an academic heritage through Agassiz from the generation of Humbolt, Cuvier, Lamarck and St. Hilaire. His geological researches are recorded in books and papers on glacial phenomena of Labrador, Maine and the White Mountains. He published (1867) a "Revision of the Fossorial Hymenoptera of N. A." In the U. S. Geological Survey (1875-1877) under Hayden he served as a zoölogist. As a member of the Kentucky Geological Survey in 1874 he investigated with Putnam the great caves and their fauna of which he later wrote, "The Cave Fauna of N. A.," 1888. He studied also the Florida reefs and the fossil fauna of Charleston, S. C. In 1882 he published a text book "First Lessons in Geology." He published works so diversified as "The Development and Anatomy of *Limulus Polyphemus*," 1871, the "Monograph of North American Phyllopod Crustacea," 1883, the "Life History of Animals, including Man, or Outlines of Comparative Embryology," 1876, the "Zoology

for Students and General Readers," 1879, miscellaneous notes and papers on anthropology and ethnology and the notable book "Lamarch, the Founder of Evolution, his Life and Work," 1901. Entomology, however, was his chief interest. Professor Samuel Henshaw in "The Entomological Writings of Alpheus Spring Packard," enumerates three hundred and thirty-nine papers, books and notes, published up to 1887. He continued to produce papers upon this subject literally up to the last week of his life when he corrected the proof of his "Monograph of the Bombycine Moths of America" etc., Memoir of the National Academy of Sciences.

In his long and active career as Naturalist, Packard was associated with many American institutions and had a prominent part in founding some of them. In 1865 he became, on returning from service as assistant surgeon in the Army of the Potomac, librarian and acting custodian of the Boston Society of Natural History. With Hyatt, Morse and Putnam, his former associates in Agassiz's laboratory, he accepted a position in the Essex Institute in Salem, and subsequently when the Peabody Academy of Science absorbed the Essex Institute, he became Curator of Invertebrates and later, 1876, Director of the Academy. The American Naturalist was founded by this group of men in the Peabody Academy in 1868 and Packard remained its editor-in-chief for twenty years. He was also prominently connected with that novel undertaking of Agassiz's which has proved to have been of inestimable value to biology in America, the Anderson School at Penikese. He taught there both years and when the school was given up on account of Agassiz's death, he perpetuated the idea by establishing a summer school of natural history at Salem under the auspices of the Peabody Academy. This he directed until 1878 when he left Salem to accept the Professorship of Zoölogy and Geology at Brown University, the position which he held until his death. As is evident from the title this professorship permitted a latitude in subject matter that suited the range of his scientific interest.

As a teacher, judged from the view point of students who have since achieved maturity, Professor Packard represents a well recognized type. He was not a disciplinarian, a pedagogue or an "educator." With impregnable faith in youth, he tried unremittingly to awaken his students to the vision of nature which to him was totally absorbing.

"It was from the judgment of his confreres, from the men who had traversed the same intellectual territory and knew it, that he reaped his supreme honors. From these alone could the reward have come;

for below the judgment of his peers there was no other guide but conscience." "Precisely to such bodies of inexorable critics did the intrinsic strength of the work of Professor Packard ultimately appeal."<sup>2</sup> The American Academy of Arts and Sciences elected him to membership in 1868; the Société Royale des Sciences de Liège, 1875; the Society of Friends of Natural Science in Moscow, in 1891. In 1891 he was elected foreign member of the Linnean Society of London. He was elected also to membership in the entomological societies of London, Paris, St. Petersburg, Stockholm and Brussels; was made one of the honorary presidents of the International Zoölogical Congress in Paris, 1899; honorary president of the Zoölogical Section of the French Association for the Advancement of Sciences; vice-president (1899) of the corresponding Section of the American Association.

A. D. MEAD.

BENJAMIN OSGOOD PEIRCE (1854-1914)

Fellow in Class I, Section 2, 1884.

The following biographical notice of Professor Benjamin Osgood Peirce is taken for the most part from the Minute on his life and services which was placed on the records of the Harvard Faculty of Arts and Sciences at the meeting of February 17, 1914. A much more extended biography will be published by the National Academy of Sciences.

Our colleague, Benjamin Osgood Peirce, who died in Cambridge on the fourteenth of January, 1914, was born in Beverly, Massachusetts, February 11, 1854, of a family belonging for several generations to the city of Salem. Of his ancestors, Richard Norman came to Gloucester in 1623, John Peirce to Watertown in 1637, John and Christopher Osgood to other parts of eastern Massachusetts before 1640. John Peirce had a son Robert, but after the Cromwellian era names taken from the Old Testament prevail in the family, and it is hard to refrain from using the robust terms of the Old Testament genealogies in recit-

---

<sup>2</sup> Carl Barus, Memorial Address.

ing the generations that follow. The son of Robert was Benjamin, and the son of Benjamin was Jerathmiel, and the son of Jerathmiel was Benjamin, 2d, who fell at Lexington, and his son was Benjamin, 3d, whose son was Benjamin Osgood, 1st, the father of our friend.

From Jerathmiel, potent name, were descended also Jerathmiel, 2d, and his son Benjamin, Librarian of Harvard College from 1826 to 1831, and his son Benjamin, Tutor or Professor of Mathematics at Harvard from 1831 to 1880, among whose sons were James Mills, also Professor of Mathematics at Harvard; and Charles Sanders, projector of the philosophic cult of Pragmatism. In the annals of intellectual achievement in America there is no greater name than Peirce.

The father of our colleague was a graduate of Waterville College in Maine. He married, in 1841, Miss Mehetable Osgood Seccomb, a native of Salem, whom he had met for the first time in Georgia, where both were engaged in teaching. After his marriage Mr. Peirce remained for several years in the South as Professor of Chemistry and Natural Philosophy at Mercer. Returning to Massachusetts in 1849, he engaged in the South African trade, and in 1864 he visited the Cape of Good Hope, taking his son with him.

When the son was sixteen years of age and a graduate of the Beverly High School, he developed an indisposition to study, a phenomenon which must have seemed a portent in his household. He was accordingly apprenticed to learn carpentry, and he worked for two years at this trade, an experience which was doubtless to his advantage in various ways.

The boy having proved a faithful apprentice received in 1872 permission to go to Harvard. He devoted himself to his studies with great zeal for the next two or three months in preparation for the College examinations, which he took all at one time in September, 1872, and he was then admitted to Harvard, with a condition, it is said, in some particular of elementary mathematics. He did not have a college room, but lived with his family in a rather distant part of Cambridge, whence he ran a telegraph line to the room of two classmates and intimate friends, Lefavour and Pine, in one of the College Halls. It is said that his health was somewhat impaired for a time by his too severe labor in preparation for the admission examinations, and it is not improbable that he established the telegraphic communication with his friends by way of diversion during this indisposition. Illness was usually for him an opportunity to do something which he might not have found time for in health.

His first scientific paper, *On the Induction Spark Produced in Breaking a Galvanic Circuit between the Poles of a Magnet*, was printed in the Proceedings of this Academy, having been presented February 9, 1875, about the middle of his Junior year in college.

He graduated at Harvard in 1876, ranking second in his class for the whole course, his friend Lefavour being first. He remained at Harvard for a year more, as an assistant to Professor Trowbridge in the Physical Laboratory, and then went to Leipsic, where he received the degree of Ph.D. in 1879. After a year in the University of Berlin, and a year of teaching Mathematics in the Boston Latin School, he returned to Harvard as Instructor in Mathematics. In 1884 he was made Assistant Professor of Mathematics and Physics, and in 1888, on the retirement of Professor Lovering, he became Hollis Professor of Mathematics and Natural Philosophy. At the time of his death he was a Fellow of the American Academy of Arts and Sciences, a member of the American Physical Society (its President during the last year of his life), of the American Philosophical Society, of the American Mathematical Society (Vice-president in 1913), of the Astronomical and Astrophysical Society of America, of the National Academy of Sciences, of the Société Française de Physique, and of the Circolo Matematico di Palermo.

He married in 1882 Miss Isabella Turnbull Landreth of Edinburgh, whom he had met when she was a student at the Leipsic Conservatory. Intimacy with her brothers, all ministers of the Scotch Church, has been one of the happy relations of this marriage. His wife and his two daughters survive him.

Our colleague was a great scholar and a remarkable man. Big and powerful of body, and ambidextrous, he was in mind also capable and proficient far beyond the ordinary measure of his fellows. He seemed to grasp with equal ease and to retain with equal tenacity the profoundest generalizations of mathematics or physics and the smallest bits of information likely to be of service in his work. He always knew the best materials and the best tools to use and the best way to use them. Fertile in ideas, strong of purpose, ceaseless, literally so, in industry, businesslike by instinct and tradition from his merchant ancestors, sympathetic and generous beyond the wishes of his friends, he was a mighty, beneficent, and genial power, wherever he took his stand; and he was successful, as few men are successful, in winning the confidence, the admiration, and the affection of those with whom he was associated.

His work, always masterly, thorough, and important, was never of



a kind, in subject or in treatment, to flare upon the attention of the public; but whenever he made the acquaintance of a mathematician or a physicist of the first rank, like the late Sir George Darwin, he was recognized as a fellow and a peer. Professor Andrew Gray of Glasgow says, "All mathematicians and physical workers in this country looked up to him as a leader of thought and investigation in America." Sir Joseph Larmor speaks of "the increasing company over here who knew and appreciated him personally" and of "the still larger number who knew only his scientific work." Karl Pearson, who was a fellow student with Peirce in Germany, writes, "Benjamin Osgood Peirce was representative of all that was best in science; he was never a self-seeker nor a self-advertiser, and I learnt more from him than from many of our professed teachers in Berlin." . . . "If I had to give the name of the man who represented America best to me, I should still say, after thirty-four years, Benjamin Osgood Peirce." It is plain from these quotations that the reputation of our friend was increasing at the time of his death.

Eminent in his profession, beyond its wide limits he was an outstanding personality to all who knew him well. He was a prodigious reader, and once told the present writer that he had read the *Encyclopedia Britannica* through several times. He was fond of meeting classical scholars on their own ground; not long before his death he quoted Ovid fluently and evinced a lively interest in the psychology of the Greek Optative. His service for many years as a member of the Harvard Committee on Honors and Higher Degrees in Music was justified by his extraordinary musical sensibility and his appreciation, intuitive as well as learned, of musical compositions. He made music in various ways, some of them rather surprising.

In a place and a time of the least restraint in religious matters he quietly declined to enter upon discussions of personal religious belief, and, though perhaps shaken at times by the same tremendous questions which beset Carlyle, he remained steadfastly in the Baptist communion to which his father had belonged. With characteristic force of grotesque phrase he described the varieties of belief which were exhibited in Appleton Chapel after the breaking up of the World's Congress held at Chicago, in 1893, as "a job lot of religions." These words indicated no bitterness or bigotry, but merely his conviction of the needlessness and uselessness of seeking abroad for religious doctrine or spiritual inspiration. At the last his own faith and trust were serene.

Peirce was proverbial among his friends for a certain habit of

extravagant self-depreciation and for a frolicsome humor of speech and action. His self-depreciation was partly caution, partly genuine modesty, of which he had great store, partly an endeavor, not always successful, to make others content with themselves, and partly it was a humorous pose. A man of his intelligence could not be altogether unaware of the scope of his own powers, and a man of his keen sympathy could not be indifferent to the appreciation of his fellows. If he found that his habitual professions of ignorance concerning matters of which he was a master were being taken seriously, he speedily took effectual measures to remove the false impression.

His habit of humorously grotesque speech was the natural outcome of abounding energy, lively invention, and an amiable desire to entertain; but it was sometimes also a measure of precaution, intended to prevent the discovery and invasion of his real thought. For, with all his genuine and hearty good-fellowship, Peirce was a man of profound reserve; he was wont to go into his closet and shut the door, and his privacy was respected. Behind his superficial timidity and his abounding kindness there was always the suggestion of something formidable, and he was not a man to be trifled with.

Peirce's last scientific paper, *The Maximum Value of the Magnetization in Iron*, June, 1913, was, like his first paper, printed in the Proceedings of this Academy. This was, indeed, his customary channel of publication, and all the members of the Academy may well be proud of this fact.

EDWIN H. HALL.

## ISRAEL COOK RUSSELL (1852-1906)

Fellow in Class II, Section 1, 1904.

The bones of a living memorial of I. C. Russell are found in the successive volumes of *Who's Who* down to 1906-7. Among the notices shortly after his death two are pre-eminent,—the one by Bailey Willis, his colleague on the U. S. Geological Survey,<sup>3</sup> which contains a full bibliography. This notice was prepared for the Geological Society of America, of which Russell was President when he died, and for which he had prepared his Presidential Address just before he was stricken with pneumonia, his last sickness. The other was by one of his colleagues at Ann Arbor, Dr. Chas. A. Davis,<sup>4</sup> who himself has just been called from this life.

Professor Russell's life may be divided into three parts:—

1. *Before his connection with the Geological Survey.* He was born at Garrattsville, N. Y., Dec. 10, 1852, son of Barnabas Russell and Louisa Sherman Cook Russell. He was of New England descent, and Willis tells good stories of the New England reserve characteristic of his ancestors and somewhat of Russell himself. When he was twelve years old he moved to Plainfield, N. J. He was then on the Newark formation, a monographic study of which was one of his principal scientific works. From his birth until the time of his connection with the United States Geological Survey we might consider him in training,—first in the High School near his home, then in the Hasbrook Institute in Jersey City, next in New York University (A. B. and C. E. 1872) then in the Columbia School of Mines. In 1874 he was photographer and naturalist to the U. S. Transit of Venus Expedition to New Zealand and Kerguelen Island. When he came back he was made assistant Professor of Geology at the Columbia School of Mines and was there from 1875 to 1877. This time included a season in New Mexico and a journey to Europe and finished the first quarter century of his life. Probably the happiest and most fruitful part of his career was the period from 1875 to 1892.

<sup>3</sup> (Bulletin of the Geological Society of America, Vol. 18, p. 582).

<sup>4</sup> (Published in the 9th report of the Michigan Academy of Sciences for 1907, p. 28). See also *Science*, Oct. 5, 1906, vol. 24, p. 427, and *Journal of Geology*, vol. 14 (1906), p. 663.

2. *Work as Government Geologist, 1877-1892.* For a quarter of a century he was a servant of the United States in the Geological Survey. And that was practically his sole occupation until 1892. He ranked with Gilbert and Powell as one of the great geologists of the early years of the Survey. Like them he was an explorer, like them he had an admirable literary style. I remember he once said that it was his custom never to write anything until the end of the day's work. In this he was doubtless aided by his retentive memory. In the relatively arid regions of the great West where geology was on a large scale such a method was no doubt quite serviceable and gave to his work a literary quality which constant jottings cannot pretend to have. But I remember well the shock it gave to one who, accustomed to working in the mines and Michigan woods, would have been utterly lost unless he had kept some sort of continuous notes. Artistic temperament was manifest in Russell not only in his literary style but in his keen appreciation of the beauties of nature, which he saw not only with the eye of the savant but with that of the artist. His description of his ascent of Mt. St. Elias is interesting to any one; his report of the Mono Lake region of California was so vivid that a demand was made for a reprint of the report, to be paid for by the residents as a tourist advertisement of the region, for which purpose its beauties of style well fitted it. His artistic temperament was also shown in his skill and success as a photographer. Many of the illustrations of the U. S. Geological Survey which are reprinted in the text books of geology will be found to have been taken by him. He had the knack of knowing whether a photograph would really show and bring out the scientific point which one can often see with the naked eye so much better than in a photograph. He also took pains to get something which would make his records not only of scientific but also of artistic value.

His artistic temperament also showed in a certain fastidiousness and reserve which perhaps made him less successful as a teacher. To be a popular teacher one must not be too fastidious or too critical of the half-baked endeavors of the partly educated. And he had not much of that superficial bonhomie which goes far toward making one generally popular.

3. *At Ann Arbor.* In 1892 he became Professor of Geology at the University of Michigan and remained so the rest of his life. He continued his connection with the U. S. Geological Survey after he became Professor of Geology at Ann Arbor; being, however, employed upon various special problems, often connected with water

resources. Even such problems, however, he could not handle solely from an economic point of view. His studies of Snake River Valley and other similar problems made a decided contribution to the general scientific theory of igneous action.

In Michigan University he made no such impression as in the work of the Geological Survey. President Angell himself told me that he did not consider that it was necessary for every State University to build up a great geological department; and as Wisconsin had had two great geologists as presidents he did not feel called upon to rival her. Nor was Russell, with his artistic temperament, the type of man who rejoices in running a large department.

He was, however, keenly interested in the Michigan Academy of Science, was among its early presidents, and served it in many ways. As his connection with the U. S. Geological Survey became less he found time to take up some of the local problems of Michigan. He was never a specialist in Paleontology and therefore did not pretend to continue the researches of Alexander Winchell, his predecessor; but he reverted naturally to those studies of the lakes and of surface geology which had interested him from the very first paper he printed. He really inspired the study of the almost unique delta of the St. Clair River made by Leon J. Cole, one of his students. He also prepared a study of the surface geology of a good part of the upper peninsula and its molding under the ice, and threw light on the origin of drumlins and hills of the same canoe-shaped type due to the remodelling of preexisting till sheets, and also on the curious Indian ridges known as eskers. Having been used to topographic maps in his western work he naturally felt the lack of them on coming to Michigan and began to agitate for the co-operation of the State with the U. S. Geological Survey in their preparation. If it had not been for him I do not think this co-operation would have begun as soon as it did.

His scientific works, a complete bibliography of which is given by Willis, may be grouped as follows:—1st, a series of papers on lakes, their origin and phenomena, in which he treats the modern Great Lakes and those of New Zealand and those shrunken remnants of lakes like the Great Lakes, out West, especially Lake Lahontan, the monograph on which he prepared; 2nd, a series of papers culminating in a correlation essay on Triassic and allied beds of the Atlantic Coast, which he called the "Newark Formation"; 3rd, a series of descriptions, in which he appears both as artist and savant, of those great contrasted phenomena of nature, the volcanic eruption and the wondrous obelisk of Mt. Pélée on the one hand, and on the other

Mount St. Elias and its piedmont glaciers. Thus his studies in the igneous rocks of the Newark formation, into the activities of Mount Pélée, the Snake River and other volcanic regions of the great West, gave him opportunities to add materially to our knowledge of igneous geology, while his explorations in Alaska, the northwestern United States and Michigan, made him one of the authorities in glacial geology.

He was, as C. A. Davis says, a delightful story teller if drawn out, brilliant and witty, so that his speeches at the early dinners of the Geological Society of America, and the passages at arms between him and Emerson shine in the writer's memory, yet he was not a man of many words. Physically he seemed small and slender for one who had proved himself an intrepid explorer, and is another illustration of the fact that much may be done by one of small size. His civic public spirit was shown by his careful report on the water supply of Ann Arbor. He held the academic distinctions which one might expect; he was President of the Michigan Academy of Science, Chairman of Section E of the American Association for the Advancement of Science, was President of the Geological Society of America at the time of his death, May 1, 1906, and was honorary Doctor of Laws of New York and Wisconsin Universities. He was married Nov. 27, 1886, to J. Augusta Olmsted and by her had four children, three daughters, Ruth, Helen, Edith, and a son, Ralph. Ruth was graduated with the degree of A.B. from the University of Michigan in 1910, and subsequently married and now resides in Salt Lake City. Helen also married and lives in Chicago.

ALFRED C. LANE.

## AUGUSTUS SAINT GAUDENS (1848-1907).

Fellow of Class III, Section 4, 1896.

Born in Dublin, Ireland, on the first day of March 1848, the son of an Irish mother and a French father, Augustus Saint Gaudens, brought to this country at the age of six months, lived to see himself acclaimed as the foremost of American sculptors. His bent for artistic expression first took the form of cameo-cutting by which he practically supported himself from the time he was thirteen till he was twenty and to which he occasionally turned for revenue during his course of art study abroad,—in Paris at the *Academie des Beaux Arts* from 1867 to 1869 and in Rome from 1869 to 1872. His first important work of a public character was the statue of Admiral Farragut erected in Union Square, New York, in 1881. This work was instantly hailed as a masterpiece and the test of thirty-five years upholds the judgment of the moment.

Saint Gaudens' fame dates from this time and was augmented by his later productions,—the Lincoln in Chicago, the Shaw in Boston, the Adams Memorial in Washington and the Peter Cooper and the equestrian statue of Sherman in New York,—all on the same high plane of excellence and all with an appeal so general as to win the applause and interest of the man in the street as well as of the artist and the connoisseur.

The success of Saint Gaudens as a sculptor of heroic works was equaled by his skill in portrait relief. One has but to recall the Stevenson Memorial, and the children of Mr. Jacob H. Schiff to acknowledge his supremacy in this domain. His treatment of the medallion, as exemplified in the portraits of Sargent and LaFarge, of Howells and Gilder, of Millet and Bunce established a precedent for an attractive form of the art that bids fair to be followed (probably at a respectful distance) for all time.

The art of Saint Gaudens is unique. Although it possesses the qualities of technique and composition, of truth to nature and respect for traditions that are common to all good art, his style is so personal, the technique is so entirely his own, and his conceptions are so original that we are hardly reminded of any preceding master in looking at them. To everything that he did, he gave the best that was in him with a thoroughness born of conscientiousness and of devotion to the

art that he loved and revered. Critical and suspicious of his own work, proving and trying every experiment by which any improvement might be gained, entirely regardless of the time expended, his successes were achieved by infinite patience and travail. This thoroughness and conscientiousness had a marked effect upon his contemporaries, and the example that he set by them and by his absolute fidelity to his ideals of perfection, by his sincerity and his impatience with sham and affectation, and, finally, by the superlative excellence of the works themselves, was felt not only by his associates, but wherever art was practiced in the land.

Besides the general influence of his finished productions, he had a more direct, if less extensive, influence through the sacrifice of time and strength that he made in teaching modeling both in his own studio and in the art schools in New York. His connection with the World's Fair in Chicago in 1893 afforded another opportunity through which his influence upon the art and artists of the country was widely extended. He was one of the committee which conceived the splendid plan of the Exposition and was the principal advisor for the sculptural decoration of the grounds, aiding incalculably the impetus that was given to art in general and to sculpture in particular by this great object lesson. It was in Chicago that the movement was inaugurated by McKim and seconded by Saint Gaudens that led to the founding of The American Academy in Rome. Even more important was the service that he rendered to the Nation as a member of the Commission, appointed by Congress, which made the comprehensive plan for the development of the City of Washington, now being carried out.

Of "Honors" Saint Gaudens naturally had many. The Degree of LL.D. from Harvard, Yale and Princeton, his election as an Officer of the Legion of Honor of France and as Corresponding Member of the *Société des Beaux Arts* in 1899, and his election as a member of the Royal Academy of London in 1906 were among the most important. Many medals came to him, also.

An urbanite from infancy, it was not till he was nearly forty years old that he discovered the country. In 1885 he began spending his summers in Cornish, N. H. where he later acquired a home and lands among the hills, and practiced, with the delight of a novice, the pastimes of skating and swimming, of tennis and golf, of which he had been defrauded in his childhood. His position as a sculptor, and the fascinating qualities of mind and heart that endeared him to all who came near him, attracted to him many distinguished artists and literary people who, with their disciples and families, made up the



community which has become famous. His later years were spent entirely here, and here on the third of August, 1907 he died after a long and painful illness.

This notice of a master-sculptor cannot close better than with the characterization of him by President Eliot upon giving to Saint Gaudens the Degree of LL.D. at Harvard in 1905:—"Augustus Saint Gaudens,—a sculptor whose art follows but enobles nature, confers fame and lasting remembrance and does not count the mortal years it takes to mold immortal forms."

DANIEL CHESTER FRENCH.

#### WILLIAM SELLERS (1824-1905)

Fellow in Class I, Section 4, 1875.

Mr. William Sellers was a representative of the school of Engineers, Manufacturers, Producers and Works Managers, which the modern trend of industry has caused very largely to disappear. He grew up with his establishment from small beginnings previous to the Civil War and was able to carry the burdens of personal supervision of its increasing work through the years until his death.

He was born in Upper Darby, Pa., on September 19, 1824. His early education was in a private school maintained by his father and his relatives for the education of their children. He served the usual apprenticeship to the machinists' trade with his uncle, John Morton Poole, of Wilmington, Del., and in 1845 he took charge of a large machine shop in Providence, R. I. After moving to Philadelphia the firm of Bancroft and Sellers was formed in 1848, and in 1853 what was then called the "new shop" at 16th Street and Pennsylvania Avenue was occupied. The firm became William Sellers and Company on the death of Mr. Bancroft about 1856, and in 1886 the company was incorporated with Mr. Sellers as President. Their specialty was the manufacture of heavy machine tools and they followed largely the practice set by the British designers as contrasted with the types which had their origin in the shops for lighter machine work in New England. For example, they adhered to the lathe bed of flat-top shears and had no use for the V-top shears of the smaller builders.

Probably the best known of his achievements in this field is the spiral gear planer drive, in which the table is moved back and forth by a multi-thread screw engaging with a rack on the under surface of the table.

In 1868 Mr. Sellers formed the Edgemoor Iron Company which furnished the structural material for the Centennial Exhibition buildings of 1876, in Philadelphia and the structural material for the first bridge between New York and Brooklyn.

In 1873 he reorganized the Midvale Steel Company at Nicetown near Philadelphia which, under his management entered the field of producing material for steel cannon for the Government.

In 1860 Mr. Sellers had his attention directed to the Gifford injector for feeding hot water to steam boilers. He commenced the manufacture of injectors under this design, but in 1865 invented and patented the self-adjusting combining tube, which automatically adjusted the supply of water to the apparatus to meet the varying requirements as the steam pressure in the boiler might vary. These injectors were made in the Sellers shop by metric sizes and with the special gages which the use of this unusual standard compelled. Further developments led to more advanced and larger sizes of injectors, particularly for locomotive service.

The Navy Department at Washington sent out specifications for a turning and boring lathe in 1890 for its 16" steel cannon. The bed was to be 73 feet long with an extension of 53 feet for the boring arrangement. Mr. Sellers made a complete new design which he considered superior to that offered by the Governmental Departments and with the co-operation of a special commission created in the American Society of Mechanical Engineers, at the request of the Navy Department and of which the late Professor John F. Sweet was an active member, the Sellers design was accepted and the Navy design was discarded. This lathe weighed more than 250 tons.

The Sellers firm is also identified with the formulation, through the Franklin Institute, of a system of standard screw threads which became known as the United States standard and was presented to the Institute at a meeting on September 16, 1864.

Mr. Sellers received about 90 U. S. patents, the earliest one in 1857 and some were pending at the time of his death — January 24, 1905, in the 81st year of his age.

Mr. Sellers received many honors in the field of applied sciences. He became a member of the Philosophical Society in 1864, and of the American Academy of Arts and Sciences in 1875. He was a member

of the Institute of Mechanical Engineers of Great Britain, the Iron and Steel Institute of Great Britain, of the American Society of Mechanical Engineers of which he was a founder in 1880 and of the American Society of Civil Engineers. He was a corresponding member of the Société d'Encouragement pour L'Industrie Nationale and also a Chevalier de la Légion d'Honneur. This decoration was conferred upon him at the close of the Paris Exposition in 1899.

F. R. HUTTON.

EDWARD HENRY STROBEL (1855-1908)

Fellow in Class III, Section 1, 1902.

It does not often fall to the lot of an American to fill positions so varied in character as those which Edward Henry Strobel held during his life of fifty-two years — Third Assistant Secretary of State, Secretary of Legation, Minister Plenipotentiary, head of a special mission, sole arbitrator between two powers, Professor of Law in the Harvard Law School, the trusted adviser of a progressive oriental government.

He was born in Charleston, South Carolina, on December 7, 1855, of a family on whose fortunes the civil war bore heavily. After due preliminary education, he entered Harvard College, was graduated with his class, that of 1877, and thereafter entered the Harvard Law School in the autumn of 1877, but did not take the degree of LL.B. until 1882. After having been admitted to the bar, he practised in New York for a short time, but soon turned to public life.

He participated in the presidential campaign of 1884, contributing an interesting pamphlet on Mr. Blaine and his foreign policy. This document seems to have attracted the attention of Mr. Cleveland, for when the latter became President, he offered Strobel the post of Secretary of Legation at Madrid. Strobel spent about five years in Spain, and acted as Chargé d'Affaires during a third of the time. In 1888 he was sent on a special mission to Morocco. On the change of administration, he tendered his resignation, but was retained in office until 1890. In 1893, President Cleveland appointed him Third Assistant Secretary of State. In 1894 he became Minister to Ecuador, and shortly thereafter was made Minister to Chile. He remained at

the latter post until 1897, accomplishing excellent work under somewhat trying conditions. At the close of his stay, he received a signal mark of distinction in being chosen by both France and Chile to arbitrate a claim of a French citizen against the government of Chile.

In 1898, Strobel was called to the Bemis Professorship of International Law in the Harvard Law School. The founder of the chair had expressed the desire that the occupant should be not merely a professor of the science, but a practical co-operator in the work of advancing knowledge and good will among nations and governments. Strobel's intellect and temperament peculiarly fitted him to improve the relations between States, and the years spent in the diplomatic service had added the qualification of experience which the late George Bemis had also mentioned when making his bequest.

As Bemis Professor, Strobel gave courses in the Law School in International Law and Admiralty. He also taught International Law in the College. He was an interesting and able instructor, and gathered large classes about him. Perhaps he felt a little impatience with "theorizing," but it is to be remembered that he had successfully handled large affairs and had carried considerable responsibilities. After four years of service as a teacher, he was called to a very different field.

In a distant corner of the Far East there lies a land which has succeeded in maintaining its independence while many other empires, kingdoms, and principalities of Asia have fallen under alien rule. How Siam has been able to accomplish this — often only with great difficulty — forms an interesting study, but it is a study which cannot be undertaken here. Suffice it to say that when in 1902 Strobel entered into relations with Siam, its political situation was one of considerable danger. He was offered, and he accepted, the post of General Adviser to the Siamese Government. While he did not reach Bangkok until March, 1904, he was occupied during a great part of the intervening time in negotiations in Europe. These resulted in a treaty with France, signed in 1902, which failed of ratification by the French Government, and of another treaty signed on February 13, 1904, and afterwards duly ratified. On the evening of the day on which the latter treaty was signed in Paris, he started for Bangkok, with the new treaty sewed in his coat pocket.

The post to which he was called was one which exactly suited his abilities and experience. Siamese foreign affairs occupied most of his attention, and here of course he was at home. The foreign affairs of the kingdom were in a condition where "theorizing" upon legal

rights and wrongs would do more harm than good. What was needed was a practical solution of problems, some of which had been pending for years. The amount of work that came into the office of the General Adviser was overwhelming. But Strobel's mind quickly grasped the questions at issue, and — what was at least as important — he understood the men with whom he had to deal. These men were of many nations and races, they came from all the countries of Western Europe and of Eastern Asia. In addition to foreign relations, he was confronted with many questions of internal administration, and to them he brought the same intelligence and skill.

In December, 1905, Strobel went home on leave. He stopped in Egypt on the way, and there was stricken with blood-poisoning, from which he never fully recovered. After fifteen months' absence, during most of which he suffered greatly, he was able to return to Siam, and immediately resumed his many activities; but he was not to be long spared, for on January 15, 1908, he died in the midst of his labors.

While the time he actually spent in Siam amounted to only about two and a half years, he left behind him a memory which is seldom, if ever, the crown of even a lifetime of work in the Far East. From the beginning, he inspired the confidence both of the Government which he served and of all with whom he came in touch. Before his arrival, perhaps not all persons in Siam looked forward with pleasure to the coming of an American to fill the highest post there open to a European. But Strobel speedily made it clear that he felt he could best serve the Siamese Government by dealing fairly and justly with every matter laid before him. Once that reputation was established, the rest was easy.

SAMUEL WILLISTON.

## WILLIAM GRAHAM SUMNER (1840-1910)

Fellow in Class III, Section 3, 1881.

William Graham Sumner, for thirty-eight years professor of Political and Social Science in Yale University, passed away on April 12, 1910, at Englewood, New Jersey. He was born at Paterson, New Jersey, October 30, 1840, of English parents, his father, Thomas Sumner, having come to America in 1836 and his mother, Sarah Graham, in 1825. He states in an autobiographical sketch that his ancestors on both sides had been artizans, and that, so far as he knew he was the first member of the family who ever studied Latin and Algebra.

His early years were spent at Hartford, Connecticut, he was graduated from Yale College in 1863, studied French and Hebrew in Geneva in 1863-64, Divinity and History at Göttingen in 1864-66, and during a part of the year 1866 he studied Anglican Theology at Oxford. Having been elected tutor at Yale he entered upon his duties in September, 1866, in which position he remained until March, 1869. He was ordained deacon in the Protestant Episcopal Church in 1867, and became assistant to the rector of Calvary Church in New York City in 1869. From September, 1870 to September, 1872, he was rector of the Church of the Redeemer at Morristown, New Jersey. In September, 1872, he began his long career as Professor of Political and Social Science at Yale, having been elected in June of that year.

His death marked the close, as his appointment at Yale had marked the beginning, of an epoch in university teaching and in the development of economic thought in this country. When he began the teaching of Political and Social Science at Yale in 1872, his subject had received very little attention in our institutions of learning, and the scientific attitude was non-existent in our public discussions. Francis A. Walker began his work in the Sheffield Scientific School the same year, and Charles F. Dunbar had begun at Harvard the year before. For many years Professor Perry at Williams and Amasa Walker at Amherst had been lecturing on Political Economy. But the rapid development of interest in these subjects may be said to date from the early seventies. Probably no one contributed more to that awakening than Professor Sumner. His teaching was so clear, so strong, and

so free from sentimentality or humbug as to compel respectful attention even on the part of those who resisted his relentless logic.

During the long controversy over soft money and free silver he stood uncompromisingly for sound money based upon the gold standard. During the equally long controversy over protectionism, he stood with equal firmness for free trade. During the greater part of this period of controversy he was on the unpopular side of both questions, but he lived to see the unpopular become the popular side of the currency question and he only lacked two years of seeing it become the popular side of the question of protectionism. His death, therefore, marks the close of the epoch in which questions of currency and protectionism were the dominant questions in American politics.

Though he began as a teacher of Political and Social Science, he soon found it necessary to restrict his field and to specialize. His final years were devoted to sociology in some of its historical and anthropological phases. Some of the results of this final specialized study were published in his book entitled "Folkways," which is a monument of exact knowledge and vast learning.

It is unfortunate that no complete list of his publications has yet been compiled. Articles from his pen are still being discovered, but the list which closes this notice, while far from complete, will indicate something of the breadth of his interests and the scope of his tireless energy.

If one were looking for the best example of the austere and productive life, the life of Professor Sumner might well be selected. His austerity and self-discipline were proverbial among his colleagues and students, but it was not a useless austerity imposed for its own sake. It was the austerity which harnesses every ounce of energy to productive work.

The following is as complete a list of Professor Sumner's works as the writer has been able to compile.

#### *Books*

The Books of the Kings, by K. C. W. F. Bahr. Translated, Enlarged, and Edited. Book 2, by W. G. Sumner, in Lange, J. P. A commentary on the Holy Scripture. Scribner, Armstrong & Company. New York. 1872. Vol. VI, 312 pp.

A History of American Currency, with chapters on the English Bank Restriction and Austrian Paper Money. To which is appended "The Bullion Report." Henry Holt & Company. New York. 1874. 391 pp.

- Lectures on the History of Protection in the United States. (Delivered before the International Free Trade Alliance) published for the New York Free Trade Club by G. P. Putnam's Sons. New York. 1877. 64 pp.
- Andrew Jackson as a Public Man. (American Statesmen Series). Houghton Mifflin & Company. Boston, New York. 1882. 402 pp.
- What Social Classes Owe to Each Other. Harper & Brothers. New York. 1883. 169 pp.
- Problems in Political Economy. Henry Holt & Company. New York. 1884. 125 pp.
- Protectionism, the -ism which teaches that Waste Makes Wealth. Henry Holt & Company. New York. 1885. 170 pp.
- Collected Essays in Political and Social Science. Henry Holt & Company. New York. 1885. 173 pp.
- Alexander Hamilton. (Makers of America Series). Dodd, Mead & Company. New York. 1890. 280 pp.
- The Financier and the Finances of the American Revolution. Dodd, Mead & Company. New York. 1891. 2 vols. 309 and 330 pp.
- Robert Morris. (Makers of America Series). Dodd, Mead & Company. New York. 1892. 172 pp.
- History of Banking in the United States. (In Dodsworth, A. W., ed. A History of Banking in all the Leading Nations. Published by Journal of Commerce and Commercial Bulletin, New York. 1896) 4 V. v. I., 3p. I., ix to xv, 385 pp.
- Folkways; A Study of the Sociological Importance of Usages, Manners, Customs, Mores and Morals. Ginn & Company. Boston. 1907. 692 pp.
- War and Other Essays. Yale University Press. New Haven. 1911. 381 pp.
- Earth-Hunger and Other Essays. Yale University Press. New Haven. 1913. 377 pp.
- The Challenge of Facts and Other Essays. Yale University Press. New Haven. 1914. 450 pp.

*Articles, etc.*

- American Finance. Williams, Boston. 1875. (Pamphlet).
- Monetary Development. In Woolsey, T. D., and others, First Century of the Republic. Harper & Brothers. New York.
- Politics in America, 1775 to 1876. *North American Review*, Vol. 122, Centennial number, pp. 47-87.
- Preface to "Our Revenue System" by A. L. Earle. Published for the Free Trade Club by G. P. Putnam's Sons, 2p. L., xi, 47 pp. (Economic Monograph No. V).
- Money and Its Laws. *International Review*. January and February, 1878. pp. 75-81.



- Bimetallism. *Princeton Review*, November, 1879, pp. 546-578.
- The Theory and Practice of Elections. *Ibid.* March, 1880, pp. 262-286, and July, 1880, pp. 24-41.
- Elections and Civil Service Reform. *Ibid.* January, 1881, pp. 129-148.
- The Argument against Protective Taxes. *Ibid.* March, 1881. pp. 241-259.
- Sociology. *Ibid.* November, 1881. pp. 303-323.
- Wages. *Ibid.* November, 1882. pp. 241-262.
- Protective Taxes and Wages. Philadelphia Tariff Commission. 1882. 21 pp.
- Political Economy and Political Science. Compiled by W. G. Sumner, D. A. Wells, W. E. Foster, R. L. Dugdale, and G. H. Putnam. New York Society for Political Education. 36 pp. 1882. Economic Tracts, No. 2).
- Our Colleges Before the Country. *Princeton Review*. March, 1884. pp. 127-140.
- Sociological Fallacies. *North American Review*. June, 1884. pp. 574-579.
- Shall Silver Be Demonetized? *Ibid.* June, 1885. pp. 485-489.
- Industrial War. *Forum*. September, 1886. pp. 1-8.
- Mr. Blaine on the Tariff. *North American Review*. October. 1886. pp. 398-405.
- What Makes the Rich Richer and the Poor Poorer? *Popular Science Monthly*, January, 1887. pp. 289-296.
- The Indians in 1887. *Forum*. May, 1887. pp. 254-262.
- State Interference. *North American Review*. August, 1887. pp. 109-119.
- Trusts and Trade Unions. *Independent*, V. 40, 1888. pp. 482-483.
- The Fall in Silver and International Competition. *Rand McNally's Banker's Monthly*. February, 1888. pp. 47-48.
- The First Steps Towards a Millennium. *Cosmopolitan*. March, 1888. pp. 32-36.
- Do We Want Industrial Peace? *Forum*. December, 1889. pp. 406-416.
- What is Civil Liberty? *Popular Science Monthly*. July, 1889. pp. 289-303.
- Liberté des Echanges. *Nouveau Dictionnaire d'Economie Politique*, vol. 2, 1891. Guillaumin et Cie, Paris. pp. 138-166.
- Absurd Effort to Make the World Over. *Forum*, V. 17, 1894. pp. 92-102.
- Banks of Issue in the United States. *Forum*, V. 22, 1896. pp. 182-191.
- The Fallacy of Territorial Extension. *Forum*, V. 21, 1896. pp. 414-419.
- The Proposed Dual Organization of Mankind. *Popular Science Monthly*, V. 49, 1896. pp. 432-439.
- The Single Gold Standard. *Chautauquan*, V. 24, 1896. pp. 72-77.
- The Coin Shilling of Massachusetts Bay. *Yale Review*, V. 7, 1898. pp. 247-280.
- The Spanish Dollar and the Colonial Shilling. *American Historical Review*. V. 3, 1898. pp. 607-619.
- The Conquest of the United States by Spain. *Yale Law Journal*, V. 8, No. 4, 1899. pp. 168-193.
- Introduction to "Anthracite Coal Industry" by Peter Roberts. Macmillan Co., New York, London. 1901. XII, pp., 11., 261 pp.

- The Predominant Issue. Burlington, Vt. Reprinted from the *International Monthly*, V. 2, 1901. pp. 496-509.
- Specimens of Investment Securities for Class Room Use. The E. P. Judd Co. New Haven. 1901. 32 pp.
- The Yakuts. Abridged from the Russian of Sieroshevski. *Journal of the Anthropological Institute of Great Britain and Ireland*, V. 31, 1902. pp. 65-110.
- Justification of Wealth. *Independent*, V. 54. 1902. pp. 1036-1040.
- Suicidal Fanaticism in Russia. *Popular Science Monthly*. V. 60, 1902. pp. 442-447.
- The Fallacies of Socialism. *Colliers Weekly*. October 29, 1904. pp. 12-13.
- Address at Dinner of the Committee on Tariff Reform of the Tariff Reform Club in the City of New York, 1906. Series 1906, No. 4. 7 pp.
- Sociology as a College Subject. *American Journal of Sociology*, V. 12, 1907. pp. 597-599.
- Mores of the Present and the Future. *Yale Review*, V. 18, 1909. pp. 233-245.
- Witchcraft. *Forum*. V. 41, 1909. pp. 410-423.
- The Family and Social Change. *American Journal of Sociology*. V. 14, 1909. pp. 577-591.
- The Status of Women in Chaldea, Egypt, India, etc., to the Time of Christ. *Forum*, V. 42, 1909. pp. 113-136.
- Religion and the Mores. *American Journal of Sociology*, V. 15, 1910. pp. 577-591.
- War. *Yale Review*, (new series). V. 1, 1911. pp. 1-27.

T. N. CARVER.

#### FREDERICK WINSLOW TAYLOR (1856-1915)

Fellow in Class I, Section 4, 1915.

It is not difficult to estimate the place of Frederick W. Taylor in the industries even though only a short time has elapsed since his death. He is the legitimate successor of James Watt. Many engineers and manufacturers have made valuable additions to the efficiency of the steam engine and to labor-saving machinery but the improvement of James Watt opened the gateway to all the inventions of the nineteenth century. Out of them have sprung the development of power and the labor-saving machinery as we have them today, and also an entirely new problem in the relation of great masses of labor to society.—It is exactly to this problem that Mr. Taylor has turned our attention. His solution of it is of precisely the same significance as James Watt's contribution to the steam engine and Mr. Taylor's work will equally transform society.

He was born in Germantown, Pa., in the year 1856. His early education was in America and two years in France and Germany. He was prepared at Phillips Exeter to enter Harvard in 1874 but his eyesight failed and he became an apprentice in the Enterprise Hydraulic Works from 1875 to 1878. Then owing to business depression he took a job as laborer in the Midvale Steel Works, where his ideas on the subject of greater system in the management of industry began to form themselves. Six years from the time of entering the Midvale Company he was Chief Engineer. In 1880 he began at night the engineering course as required at Stevens Institute, where he obtained the degree of Mechanical Engineer in 1883.

He left Midvale in 1890, having inaugurated a system of shop management and having increased the output from two hundred to three hundred per cent. From 1890 to '93 he was manager of the Manufacturing Investment Company, operating paper mills in Maine. From then on he was consulting engineer on machine-shop efficiency. He was employed by the Bethlehem Steel Company and there made the investigation on tool steel and with Mr. Maunsel White discovered the process of heat treatment which has revolutionized shop practice. He presented his system of shop management to the American Society of Mechanical Engineers in a paper called "The Piece Rate System" and in 1906, when he was president of the Society, he presented the result of twenty-six years' investigation in an exhaustive paper on "The Art of Cutting Metal." This was a splendid example of scientific research by an engineer in active practice of his profession. He died on March 21, 1915.

The term "scientific management," under which his work will probably be known, was devised by Mr. Taylor and gained currency chiefly through the testimony of Louis D. Brandeis before a committee of Congress on the Railroad Petition for a Raise in Rates. If the writer of the above may be permitted to comment through his personal acquaintance with Mr. Taylor, he would say that the system never was intended or planned to fetter in any way the enterprise of workmen but was thought by the inventor to be a method of promoting ambition and the highest good of every workman as well as of society. His system, scientific management, is simply a plan under which the work of the industries can be done effectively and with a minimum expenditure of energy. It has come to stay because it has called attention to absolutely necessary organization if mankind is to have a real and lasting benefit from the inventions that followed the use of the steam engine and of stored energy.

I. N. HOLLIS.

## FRIEDRICH DANIEL VON RECKLINGHAUSEN (1833-1910)

Honorary Foreign Member in Class II, Section 4, 1898.

Friedrich Daniel von Recklinghausen, one of the foremost among the German pathologists, distinguished both as a teacher and investigator, was born in Westphalia in 1833. After passing through the gymnasium he studied medicine in the Universities of Bonn, Würzburg, and Berlin, and obtained the doctor degree in 1855. His dissertation and his first medical publication in 1855 was "De pyaemiae theoriis" in which he reviewed and discussed the different theories concerning pyaemia, giving the reasons in favor of its separation from wound infection. His entry into medicine was at the age when men here are graduating from college. He then devoted himself to pathology in the laboratory of Rudolf Virchow and after three semesters in Berlin, and studies in Vienna, Rome, and Paris, he was named an assistant in the pathological institute in Berlin in 1858, holding this position until 1864. In the summer of this year, without passing through the usual stages of Docent and Professor Extraordinary, he was chosen as Professor of Pathological Anatomy in Königsberg, and, after one-half year here, to the higher post in Würzburg. In 1872 he was one of the first professors chosen to the new University founded in Strassburg, where he remained as Professor of General Pathology and Pathological Anatomy until 1906, at which time he became Emeritus. After this he continued to work with his usual diligence in the institute with which his name will always be associated, complaining of the short space of time remaining to him for the completion of his numerous investigations. He was instrumental in having called to the new university such men as Golz, Leyden and Waldyer. In 1877 he constructed the new laboratory of the University, and which at that time was regarded as in all respects a model. In 1883 he functioned as Rector of the University, and in 1884 he refused the call to Leipzig as the successor to Cohnheim. He died suddenly in 1910 in his seventy-seventh year.

Up to 1862 he had published as assistant to Virchow a large number of minor papers on a variety of subjects, some of them involving chemical research. In 1862 appeared the first of the great monographs for which he was distinguished on "Die Lymphgefäße und ihre Beziehungen zum Bindegewebe." In this he first described the method of the use of silver to demonstrate the lines of junction of cells, and showed

that the connective tissue was filled with spaces communicating with lymphatics, and in which the cells lie. This work led him to the study of the character of the cells in the tissue, and in a further publication "Über Eiter und Bindegewebs-körperchen" he showed the amoeboid motion of certain of the cells, and their identity with leucocytes and pus cells. This work undoubtedly paved the way to the studies of Cohnheim on leucocyte migration and inflammation, Cohnheim being a young assistant in the laboratory. During his professorship in Würzburg a great number of important publications on pathological anatomical conditions appeared, in one of which "Über Pilzmetastasen" he showed for the first time the relation between metastatic inflammatory foci and masses of bacteria in the blood vessels.

It was during the period in Strassburg that his wonderful activity in scientific research reached its acme. There are few subjects, either in general pathology or in pathological anatomy, which were not advanced through his work. His various researches on the blood, the heart and circulation were followed in 1883 by a large and comprehensive work "Handbuch der Ernährung." This work, which treats of the different forms of disturbances of the circulation and nutrition, is based on his rich experience and his wide knowledge of the literature of the subject, and remains a veritable mine of information for one working on the subject. In 1881 the monograph "Über die multiplen Fibrome der Haut und ihre Beziehung zu den multiplen Neuomen" appeared as a contribution in honor of Rudolf Virchow's twenty-five year jubilee. The article is a classic, showing the relation of the multiple fibromas to the nerves of the skin, and the condition since then has been known as von Recklinghausen's Disease. In 1886 appeared in Virchow's Archives a series of articles "Untersuchungen über Spinabifida" which must be reckoned among the most important contributions of this painstaking and prolific author. The work is based on thorough macro and microscopic investigation of a large amount of material, and the subject, formerly obscure, was completely cleared up.

The peculiar tumors of the uterus and Fallopian tubes, the adenomyomata, are treated in a series of articles between 1893-99. He was especially attracted to the diseases of bones which form, from the complexity of the tissue and the nature of the material, one of the most difficult subjects in pathology. In 1891 he published a large monograph on "Die fibröse oder deformierender Ostitis," a condition which is also known as von Recklinghausen's Disease, and this was followed by a great number of articles on various forms of bone disease and resulting deformities. The last great work, on the subject "Unter-

suchungen uber Rachitis und Osteomalacie" with 127 illustrations and 41 plates, appeared in 1910, the year of his death.

In addition to the great number of medical publications he found time for several important addresses, he attended medical societies and associations and took part in discussions. He was never controversial, although critical of all that seemed to lack in scientific accuracy. He was equally great as a teacher; many of the men who hold important positions in pathology received their first inspiration and training from him, as Friedländer, Zahn, Schmidt, Köster, Foa, Stilling, Perneck, Aschoff, Murpiero, Griffini and Sacordotti. His laboratory was sought by both German and foreigners, and there was a constant flow of publications from his students. As a lecturer he was simple and direct, using specimens freely in illustration; his style in writing however was the reverse of simple, and he was difficult to follow. The laboratory was constructed on the cell system, the students were given a small room, a subject for work, and material, and he inculcated independence of observation with simplicity of method. In all of his work he used the simple methods with which he had begun to work, and it is amazing what he was able to do with scalpel, scissors and microscope. When I worked in his laboratory in 1883 there was not a microtome in it, and this instrument had long been regarded as indispensable for microscopic work. Sections were stained with picocarmine and mounted in glycerine, and he was suspicious of all the newer methods which were coming into use and which have led to enormous advance in knowledge of structure. I found his demonstrations in pathological anatomy, which were held three times in the week, of great interest and value. The students, each with a microscope and a few reagents, were seated at long tables along which the specimens were passed after the professor had explained them, and each student took pieces for study as they went along. The disadvantage of the method was that the progress of the material was so slow that in the two hours of the exercise the specimens rarely reached the last fourth of the class.

Although in his great work on the diseases of the circulation he treated the pathology of function as well as structure, his conclusions are based more on his rich anatomical knowledge than on experimental evidence. He was by nature conservative, and though he welcomed each advance in knowledge, he did not seem to realize the great change in the point of view which came into pathology with the discovery of the methods of bacteriological investigation, although his observations on bacterial emboli are among the fundamental studies in bacteriology. He was essentially a pathological anatomist, his

work was based on embryology and the study of stages of processes, as revealed in the abundant material which was at his disposal and of which he made skilful use, rather than on the experimental method. There is a disposition at present to decry all knowledge not based on experiment, but we must remember that there is not a radical difference between the methods of observation and experiment in disease. The anatomical lesions studied are the results of experiments made by nature in which it is true all the conditions are not known and judgment as to their nature mode of production and relations are based on embryology and stages in the process revealed in the differing single examples which arise. Of this method von Recklinghausen was a master, and most of his work has borne the test of time.

He was a tireless worker, arriving at the laboratory at seven in the morning, and often remaining late into the night. His life was quiet, without distraction, and eminently serviceable. Our ideas of German culture have been derived from the work and lives of such men as this.

W. T. COUNCILMAN.

#### OLIVER CLINTON WENDELL (1845-1912)

Fellow in Class I, Section 1, 1884.

Oliver Clinton Wendell was born at Dover, N. H., on May 7, 1845. After a life largely devoted to astronomical research, he died in Cambridge, Mass., on November 5, 1912.

Mr. Wendell was fitted for college in the old academy of his native town, and graduated from Bates College in 1868. From this college, also, he received the degree of Master of Arts, in 1871, and of Doctor of Science, in 1907. He was one of the comparatively few men who seemed "predestined" to a specific career, for on his graduation it was announced by the President of the college that one of the small class of five was to be an astronomer. This was Wendell, who apparently had come to this decision in his sophomore year. Two months after leaving college he began work at the Harvard College Observatory, but a year later he was compelled to resign his position on account of illness.

For about ten years he found it necessary to engage in outdoor pursuits. During a part of this time he was an assistant to the eminent engineer, James B. Francis, a man to whom he often referred in



terms of the highest admiration. During this period, also, he was offered a professorship of astronomy at Bates College, a position he was obliged to decline on account of ill health. This was, perhaps, unfortunate, for such a position would have given him, as a teacher, an excellent opportunity for the full expression of his personality.

He returned to the Harvard Observatory in 1879, and was made Assistant Professor of Astronomy in 1898, a position he held during the remainder of his life. His work at the Observatory was chiefly with the 15-inch equatorial, which in early days was often referred to as "The Great Telescope." During the latter part of his life he was almost the sole observer with this telescope, and his relation with it was of the nature of an intimate friendship. Even on cloudy nights, when no work could be done, he appeared to enjoy being near the instrument, which he really loved.

Mr. Wendell observed the eclipses of the satellites of Jupiter from 1891 to 1912. This work required his presence at all hours of the night, a hardship which did not lessen his enthusiasm. He often came to the Observatory on cold winter nights, even when the chance of securing observations was small. He took part in the observation and reduction of the work of the 4-inch meridian photometer, but his principal work was with the photometer having achromatic prisms, attached to the 15-inch telescope. With this instrument he observed variable stars and asteroids. The results are probably the most accurate which had been obtained up to that time. He discovered several new variable stars and two variable asteroids. Although he was able to devote less time to the subject, he had a deep interest in comets, and, in his earlier years at the Observatory, took part in their observation and the computation of their orbits. The results of his astronomical work will be found in Volumes 13, 23, 24, 33, 37, 52, and 69 of the *Annals of the Astronomical Observatory of Harvard College*.

Mr. Wendell took his vocation with great seriousness. To him, nothing compared in interest with astronomy. It absorbed him, not, however, to the exclusion of a poetic element, which expressed itself at different times in verse. Regarding this phase of his character, however, he was very reticent. Also, he had a sincere faith in the truth of the Christian religion, and an intense belief in the immortality of the soul. He was married, in 1870, to Sarah Butler, of Hanover, Mass., who was a most devoted and loyal helper. Her death, in 1910, was a shock from which he never fully recovered. It left him lonely and inconsolable till his own death two years later. Two sons survive them.

S. I. BAILEY.



# American Academy of Arts and Sciences

## OFFICERS AND COMMITTEES FOR 1918-19

### PRESIDENT.

CHARLES P. BOWDITCH.

### VICE-PRESIDENTS.

**Class I.**  
ELIHU THOMSON,

**Class II.**  
WILLIAM M. DAVIS,

**Class III.**  
GEORGE F. MOORE.

### CORRESPONDING SECRETARY.

HARRY W. TYLER.

### RECORDING SECRETARY.

WM. STURGIS BIGELOW.

### TREASURER.

HENRY H. EDES.

### LIBRARIAN.

ARTHUR G. WEBSTER.

### COUNCILLORS.

**Class I.**  
HARVEY N. DAVIS,

**Class II.**  
BENJAMIN L. ROBINSON,  
*Terms expire 1919.*

**Class III.**  
FRED N. ROBINSON.

GREGORY P. BAXTER,

WILLIAM M. WHEELER,  
*Terms expire 1920.*

ARCHIBALD C. COOLIDGE.

HENRY LEFAVOUR,

WILLIAM T. SEDGWICK,  
*Terms expire 1921.*

BARRETT WENDELL.

GEORGE D. BIRKHOFF,

CHARLES H. WARREN,  
*Terms expire 1922.*

FREDERIC DODGE.

### COMMITTEE OF FINANCE.

HENRY P. WALCOTT,

JOHN TROWBRIDGE,

HAROLD MURDOCK.

### RUMFORD COMMITTEE.

EDWARD C. PICKERING,  
LOUIS BELL,

CHARLES R. CROSS, *Chairman*,  
ARTHUR G. WEBSTER,  
ARTHUR A. NOYES,

ELIHU THOMSON,  
THEODORE LYMAN.

### C. M. WARREN COMMITTEE.

WALTER L. JENNINGS,  
ARTHUR A. NOYES,

HENRY P. TALBOT, *Chairman*,  
CHARLES L. JACKSON,  
ARTHUR D. LITTLE,

GREGORY P. BAXTER,  
WILLIAM H. WALKER.

### COMMITTEE OF PUBLICATION.

EDWARD V. HUNTINGTON, of Class I, *Chairman*,  
JAY B. WOODWORTH, of Class II, ALBERT A. HOWARD, of Class III.

### COMMITTEE ON THE LIBRARY.

HARRY M. GOODWIN,

ARTHUR G. WEBSTER, *Chairman*,  
of Class I, THOMAS BARBOUR, of Class II,  
WILLIAM C. LANE, of Class III.

### AUDITING COMMITTEE.

GEORGE R. AGASSIZ,

JOHN E. THAYER,

### HOUSE COMMITTEE.

LOUIS DERR,

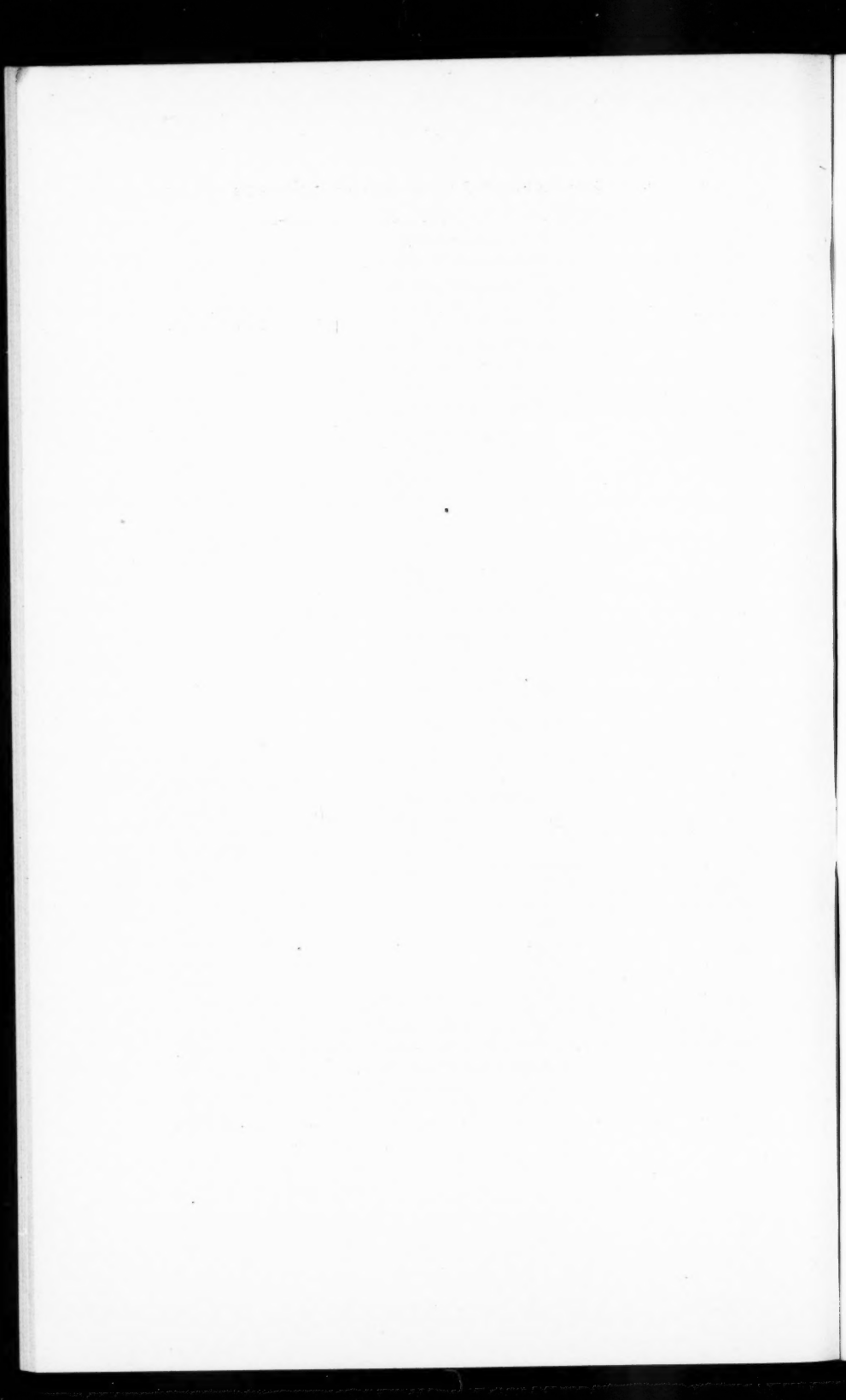
GEORGE R. AGASSIZ, *Chairman*, WM. STURGIS BIGELOW.

### COMMITTEE ON MEETINGS.

WILLIAM M. DAVIS,

THE PRESIDENT,  
THE RECORDING SECRETARY,  
EDWIN B. WILSON,

GEORGE F. MOORE.



LIST  
OF THE  
FELLOWS AND FOREIGN HONORARY MEMBERS.

(Corrected to July 1, 1918.)

FELLOWS.—526.

(Number limited to six hundred.)

CLASS I.—*Mathematical and Physical Sciences*.—183.

SECTION I.—*Mathematics and Astronomy*.—39.

George Russell Agassiz . . . . .	Boston
Raymond Clare Archibald . . . . .	Providence, R. I.
Solon Irving Bailey . . . . .	Cambridge
Edward Emerson Barnard . . . . .	Williams Bay, Wis.
George David Birkhoff . . . . .	Cambridge
Charles Leonard Bouton . . . . .	Cambridge
Ernest William Brown . . . . .	New Haven, Conn.
Sherburne Wesley Burnham . . . . .	Williams Bay, Wis.
William Elwood Byerly . . . . .	Cambridge
William Wallace Campbell . . . . .	Mt. Hamilton, Cal.
Julian Lowell Coolidge . . . . .	Cambridge
George Cary Comstock . . . . .	Madison, Wis.
Leonard Eugene Dickson . . . . .	Chicago, Ill.
Philip Fox . . . . .	Evanston, Ill.
Fabian Franklin . . . . .	New York, N. Y.
Edwin Brant Frost . . . . .	Williams Bay, Wis.
Frank Lauren Hitchcock . . . . .	Belmont
Edward Vermilye Huntington . . . . .	Cambridge
Dunham Jackson . . . . .	Cambridge
Edward Skinner King . . . . .	Cambridge
Carl Otto Lampland . . . . .	Flagstaff, Ariz.

Joel Hastings Metcalf . . . . .	Winchester
Clarence Lemuel Elisha Moore . . . . .	Watertown
Eliakim Hastings Moore . . . . .	Chicago, Ill.
Frank Morley . . . . .	Baltimore, Md.
Henry Bayard Phillips . . . . .	Boston
Edward Charles Pickering . . . . .	Cambridge
William Henry Pickering . . . . .	Cambridge
Charles Lane Poor . . . . .	New York, N. Y.
Roland George Dwight Richardson . . . . .	Cambridge
Arthur Searle . . . . .	Cambridge
Vesto Melvin Slipper . . . . .	Flagstaff, Ariz.
Frederick Slocum . . . . .	Middletown, Conn.
John Nelson Stockwell . . . . .	Cleveland, O.
William Edward Story . . . . .	Worcester
Henry Taber . . . . .	Worcester
Harry Walter Tyler . . . . .	Newton
Robert Wheeler Willson . . . . .	Cambridge
Frederick Shenstone Woods . . . . .	Newton

CLASS I., SECTION II.—*Physics*.—58.

Joseph Sweetman Ames . . . . .	Baltimore, Md.
Carl Barus . . . . .	Providence, R. I.
Louis Agricola Bauer . . . . .	Washington, D. C.
Alexander Graham Bell . . . . .	Washington, D. C.
Louis Bell . . . . .	Newton
Clarence John Blake . . . . .	Boston
Percy Williams Bridgman . . . . .	Cambridge
Henry Andrews Bumstead . . . . .	New Haven, Conn.
George Ashley Campbell . . . . .	New York, N. Y.
Emory Leon Chaffee . . . . .	Belmont
Daniel Frost Comstock . . . . .	Brookline
William David Coolidge . . . . .	Schenectady, N. Y.
Henry Crew . . . . .	Evanston, Ill.
Charles Robert Cross . . . . .	Brookline
Harvey Nathaniel Davis . . . . .	Cambridge
Arthur Louis Day . . . . .	Washington, D. C.
Louis Derr . . . . .	Brookline
William Johnson Drisko . . . . .	Winchester
William Duane . . . . .	Boston

Alexander Wilmer Duff . . . . .	Worcester
Arthur Woolsey Ewell . . . . .	Worcester
Harry Manley Goodwin . . . . .	Brookline
George Ellery Hale . . . . .	Pasadena, Cal.
Edwin Herbert Hall . . . . .	Cambridge
Hammond Vinton Hayes . . . . .	Boston
William Leslie Hooper . . . . .	Somerville
John Charles Hubbard . . . . .	New York, N. Y.
Gordon Ferrie Hull . . . . .	Hanover, N. H.
Charles Clifford Hutchins . . . . .	Brunswick, Me.
James Edmund Ives . . . . .	Worcester
William White Jacques . . . . .	Boston
Norton Adams Kent . . . . .	Cambridge
Frank Arthur Laws . . . . .	Boston
Henry Lefavour . . . . .	Boston
Theodore Lyman . . . . .	Brookline
Richard Cockburn Maclaurin . . . . .	Boston
Thomas Corwin Mendenhall . . . . .	Ravenna, O.
Ernest George Merritt . . . . .	Ithaca, N. Y.
Albert Abraham Michelson . . . . .	Chicago, Ill.
Dayton Clarence Miller . . . . .	Cleveland, O.
Robert Andrews Millikan . . . . .	Chicago, Ill.
Harry Wheeler Morse . . . . .	Los Angeles, Cal.
Edward Leamington Nichols . . . . .	Ithaca, N. Y.
Ernest Fox Nichols . . . . .	Hanover, N. H.
Charles Ladd Norton . . . . .	Boston
George Washington Pierce . . . . .	Cambridge
Michael Idvorsky Pupin . . . . .	New York, N. Y.
Wallace Clement Sabine . . . . .	Boston
Frederick Albert Saunders . . . . .	Poughkeepsie, N. Y.
John Stone Stone . . . . .	New York, N. Y.
Maurice deKay Thompson . . . . .	Brookline
Elihu Thomson . . . . .	Swampscott
John Trowbridge . . . . .	Cambridge
Arthur Gordon Webster . . . . .	Worcester
Charles Herbert Williams . . . . .	Milton
Edwin Bidwell Wilson . . . . .	Brookline
Robert Williams Wood . . . . .	Baltimore, Md.
John Zeleny . . . . .	New Haven, Conn.

CLASS I., SECTION III.—*Chemistry*.—45.

Wilder Dwight Bancroft . . . . .	Ithaca, N. Y.
Gregory Paul Baxter . . . . .	Cambridge
Marston Taylor Bogert . . . . .	New York, N. Y.
Bertram Borden Boltwood . . . . .	New Haven, Conn.
William Crowell Bray . . . . .	Berkeley, Cal.
Russell Henry Chittenden . . . . .	New Haven, Conn.
Arthur Messinger Comey . . . . .	Chester, Pa.
Charles William Eliot . . . . .	Cambridge
Henry Fay . . . . .	Boston
George Shannon Forbes . . . . .	Cambridge
Frank Austin Gooch . . . . .	New Haven, Conn.
Lawrence Joseph Henderson . . . . .	Cambridge
Charles Loring Jackson . . . . .	Cambridge
Walter Louis Jennings . . . . .	Worcester
Grinnell Jones . . . . .	Cambridge
Elmer Peter Kohler . . . . .	Cambridge
Charles August Kraus . . . . .	Worcester
Arthur Becket Lamb . . . . .	Cambridge
Irving Langmuir . . . . .	Schenectady, N. Y.
Gilbert Newton Lewis . . . . .	Berkeley, Cal.
Warren Kendall Lewis . . . . .	Boston
Arthur Dehon Little . . . . .	Brookline
Charles Frederic Mabery . . . . .	Cleveland, O.
Forris Jewett Moore . . . . .	Boston
George Dunning Moore . . . . .	Worcester
Edward Williams Morley . . . . .	West Hartford, Conn.
Harmon Northrop Morse . . . . .	Baltimore, Md.
Samuel Parsons Mulliken . . . . .	Boston
Charles Edward Munroe . . . . .	Washington, D. C.
James Flack Norris . . . . .	Brookline
Arthur Amos Noyes . . . . .	Boston
William Albert Noyes . . . . .	Urbana, Ill.
Thomas Burr Osborne . . . . .	New Haven, Conn.
Samuel Cate Prescott . . . . .	Brookline
Ira Remsen . . . . .	Baltimore, Md.
Robert Hallowell Richards . . . . .	Jamaica Plain
Theodore William Richards . . . . .	Cambridge
Martin André Rosanoff . . . . .	Pittsburgh, Pa.
Stephen Paschall Sharples . . . . .	Cambridge

Miles Standish Sherrill . . . . .	Brookline
Alexander Smith . . . . .	New York, N. Y.
Julius Oscar Stieglitz . . . . .	Chicago, Ill.
Henry Paul Talbot . . . . .	Newton
William Hultz Walker . . . . .	Boston
Willis Rodney Whitney . . . . .	Schenectady, N. Y.

CLASS I., SECTION IV.—*Technology and Engineering.*—41.

Henry Larcom Abbot . . . . .	Cambridge
Comfort Avery Adams . . . . .	Cambridge
Bernard Arthur Behrend . . . . .	Boston
William Herbert Bixby . . . . .	Washington, D. C.
Francis Tiffany Bowles . . . . .	Boston
Charles Francis Brush . . . . .	Cleveland, O.
William Hubert Burr . . . . .	New Canaan, Conn.
John Joseph Carty . . . . .	New York, N. Y.
Eliot Channing Clarke . . . . .	Boston
Harry Ellsworth Clifford . . . . .	Newton
Desmond FitzGerald . . . . .	Brookline
John Ripley Freeman . . . . .	Providence, R. I.
George Washington Goethals . . . . .	New York, N. Y.
John Hays Hammond . . . . .	New York, N. Y.
Rudolph Hering . . . . .	New York, N. Y.
Ira Nelson Hollis . . . . .	Worcester
Henry Marion Howe . . . . .	New York, N. Y.
Hector James Hughes . . . . .	Cambridge
Alexander Crombie Humphreys . . . . .	New York, N. Y.
Dugald Caleb Jackson . . . . .	Cambridge
Lewis Jerome Johnson . . . . .	Cambridge
Arthur Edwin Kennelly . . . . .	Cambridge
Gaetano Lanza . . . . .	Philadelphia, Pa.
William Roscoe Livermore . . . . .	Boston
Lionel Simeon Marks . . . . .	Cambridge
Edward Furber Miller . . . . .	Newton
Hiram Francis Mills . . . . .	South Hingham
Charles Francis Park . . . . .	Boston
William Barclay Parsons . . . . .	New York, N. Y.
Cecil Hobart Peabody . . . . .	Boston
Harold Pender . . . . .	Cambridge
Albert Sauveur . . . . .	Cambridge

Peter Schwamb . . . . .	Arlington
Henry Lloyd Smyth . . . . .	Cambridge
Charles Milton Spofford . . . . .	Brookline
Frederic Pike Stearns . . . . .	Boston
Charles Proteus Steinmetz . . . . .	Schenectady, N. Y.
George Fillmore Swain . . . . .	Cambridge
George Chandler Whipple . . . . .	Cambridge
Robert Simpson Woodward . . . . .	Washington, D. C.
Joseph Ruggles Worcester . . . . .	Boston

CLASS II.—*Natural and Physiological Sciences.*—170.

SECTION I.—*Geology, Mineralogy, and Physics of the Globe.*—53.

Wallace Walter Atwood . . . . .	Cambridge
Joseph Barrell . . . . .	New Haven, Conn.
George Hunt Barton . . . . .	Cambridge
Isaiah Bowman . . . . .	Washington, D. C.
Thomas Chrowder Chamberlin . . . . .	Chicago, Ill.
William Bullock Clark . . . . .	Baltimore, Md.
John Mason Clarke . . . . .	Albany, N. Y.
Henry Helm Clayton . . . . .	Canton
Herdman Fitzgerald Cleland . . . . .	Williamstown
William Otis Crosby . . . . .	Jamaica Plain
Reginald Aldworth Daly . . . . .	Cambridge
Edward Salisbury Dana . . . . .	New Haven, Conn.
Walter Gould Davis . . . . .	Cordova, Arg.
William Morris Davis . . . . .	Cambridge
Benjamin Kendall Emerson . . . . .	Amherst
William Ebenezer Ford . . . . .	New Haven, Conn.
Grove Karl Gilbert . . . . .	Washington, D. C.
James Walter Goldthwait . . . . .	Hanover, N. H.
Louis Caryl Graton . . . . .	Cambridge
Herbert Ernest Gregory . . . . .	New Haven, Conn.
Ellsworth Huntington . . . . .	Milton
Oliver Whipple Huntington . . . . .	Newport, R. I.
Robert Tracy Jackson . . . . .	Peterborough, N. H.
Thomas Augustus Jaggar . . . . .	Honolulu, H. I.
Douglas Wilson Johnson . . . . .	New York, N. Y.
Alfred Church Lane . . . . .	Cambridge
Andrew Cowper Lawson . . . . .	Berkeley, Cal.



Charles Kenneth Leith . . . . .	Madison, Wis.
Waldemar Lindgren . . . . .	Brookline
Frederic Brewster Loomis . . . . .	Amherst
Alexander George McAdie . . . . .	Readville
William John Miller . . . . .	Northampton
Charles Palache . . . . .	Cambridge
John Elliott Pillsbury . . . . .	Washington, D. C.
Louis Valentine Pirsson . . . . .	New Haven, Conn.
Raphael Pumpelly . . . . .	Newport, R. I.
Percy Edward Raymond . . . . .	Cambridge
William North Rice . . . . .	Middletown, Conn.
Robert Wilcox Sayles . . . . .	Cambridge
Charles Schuchert . . . . .	New Haven, Conn.
William Berryman Scott . . . . .	Princeton, N. J.
Hervey Woodburn Shimer . . . . .	Watertown
Charles Richard Van Hise . . . . .	Madison, Wis.
Thomas Wayland Vaughan . . . . .	Washington, D. C.
Charles Doolittle Walcott . . . . .	Washington, D. C.
Robert DeCourcy Ward . . . . .	Cambridge
Charles Hyde Warren . . . . .	Auburndale
Herbert Percy Whitlock . . . . .	Albany, N. Y.
Bailey Willis . . . . .	Palo Alto, Cal.
Samuel Wendell Williston . . . . .	Chicago, Ill.
John Eliot Wolff . . . . .	Cambridge
Jay Backus Woodworth . . . . .	Cambridge
Frederick Eugene Wright . . . . .	Washington, D. C.

CLASS II., SECTION II.—*Botany*.—30.

Oakes Ames . . . . .	North Easton
Irving Widmer Bailey . . . . .	Cambridge
Liberty Hyde Bailey . . . . .	Ithaca, N. Y.
Douglas Houghton Campbell . . . . .	Palo Alto, Cal.
George Perkins Clinton . . . . .	New Haven, Conn.
Frank Shipley Collins . . . . .	North Eastham
John Merle Coulter . . . . .	Chicago, Ill.
Bradley Moore Davis . . . . .	Philadelphia, Pa.
Edward Murray East . . . . .	Jamaica Plain
Alexander William Evans . . . . .	New Haven, Conn.
William Gilson Farlow . . . . .	Cambridge
Merritt Lyndon Fernald . . . . .	Cambridge
George Lincoln Goodale . . . . .	Cambridge

Robert Almer Harper . . . . .	New York, N. Y.
John George Jack . . . . .	East Walpole
Edward Charles Jeffrey . . . . .	Cambridge
Fred Dayton Lambert . . . . .	Tufts College
Burton Edward Livingston . . . . .	Baltimore, Md.
George Richard Lyman . . . . .	Washington, D. C.
Winthrop John Vanleuven Osterhout . . . . .	Cambridge
Alfred Rehder . . . . .	Jamaica Plain
Lincoln Ware Riddle . . . . .	Wellesley
Benjamin Lincoln Robinson . . . . .	Cambridge
Charles Sprague Sargent . . . . .	Brookline
William Albert Setchell . . . . .	Berkeley, Cal.
Arthur Bliss Seymour . . . . .	Cambridge
Erwin Frink Smith . . . . .	Washington, D. C.
John Donnell Smith . . . . .	Baltimore, Md.
Willaim Codman Sturgis . . . . .	New York, N. Y.
Roland Thaxter . . . . .	Cambridge
William Trelease . . . . .	Urbana, Ill.

CLASS II., SECTION III.—*Zoology and Physiology*.—54.

Glover Morrill Allen . . . . .	Boston
Joel Asaph Allen . . . . .	New York, N. Y.
John Wallace Baird . . . . .	Worcester
Thomas Barbour . . . . .	Boston
Francis Gano Benedict . . . . .	Boston
Henry Bryant Bigelow . . . . .	Concord
Robert Payne Bigelow . . . . .	Brookline
John Lewis Bremer . . . . .	Boston
William Brewster . . . . .	Cambridge
Charles Thomas Brues . . . . .	Boston
Hernon Carey Bumpus . . . . .	Tufts College
Walter Bradford Cannon . . . . .	Cambridge
William Ernest Castle . . . . .	Belmont
Charles Value Chapin . . . . .	Providence, R. I.
Samuel Fessenden Clarke . . . . .	Williamstown
Edwin Grant Conklin . . . . .	Princeton, N. J.
William Thomas Councilman . . . . .	Boston
Joseph Augustine Cushman . . . . .	Sharon
William Healey Dall . . . . .	Washington, D. C.
Charles Benedict Davenport . . . . .	Cold Spring Harbor, N. Y.

Gilman Arthur Drew . . . . .	Woods Hole
Alexander Forbes . . . . .	Milton
Samuel Henshaw . . . . .	Cambridge
Leland Ossian Howard . . . . .	Washington, D. C.
Herbert Spencer Jennings . . . . .	Baltimore, Md.
Charles Willison Johnson . . . . .	Brookline
Charles Atwood Kofoid . . . . .	Berkeley, Cal.
Frederic Thomas Lewis . . . . .	Waban
Ralph Stayner Lillie . . . . .	Worcester
Jacques Loeb . . . . .	New York, N. Y.
Richard Swann Lull . . . . .	New Haven, Conn.
Franklin Paine Mall . . . . .	Baltimore, Md.
Edward Laurens Mark . . . . .	Cambridge
Ernest Gale Martin . . . . .	Palo Alto, Cal.
Albert Davis Mead . . . . .	Providence, R. I.
Edward Sylvester Morse . . . . .	Salem
Herbert Vincent Neal . . . . .	Tufts College
Henry Fairfield Osborn . . . . .	New York, N. Y.
George Howard Parker . . . . .	Cambridge
John Charles Phillips . . . . .	Wenham
James Jackson Putnam . . . . .	Boston
Herbert Wilbur Rand . . . . .	Cambridge
William Emerson Ritter . . . . .	La Jolla, Cal.
William Thompson Sedgwick . . . . .	Boston
Percy Goldthwait Stiles . . . . .	Newtonville
John Eliot Thayer . . . . .	Lancaster
Addison Emory Verrill . . . . .	New Haven, Conn.
John Broadus Watson . . . . .	Washington, D. C.
Arthur Wisswald Weyssse . . . . .	Boston
William Morton Wheeler . . . . .	Boston
Harris Hawthorne Wilder . . . . .	Northampton
Edmund Beecher Wilson . . . . .	New York, N. Y.
Frederick Adams Woods . . . . .	Brookline
Robert Mearns Yerkes . . . . .	Washington, D. C.

CLASS II., SECTION IV.—*Medicine and Surgery.*—33.

Edward Hickling Bradford . . . . .	Boston
Henry Asbury Christian . . . . .	Boston
Harvey Cushing . . . . .	Boston
David Linn Edsall . . . . .	Boston

Harold Clarence Ernst . . . . .	Jamaica Plain
Simon Flexner . . . . .	New York, N. Y.
William Crawford Gorgas . . . . .	Washington, D. C.
Robert Battey Greenough . . . . .	Boston
William Stewart Halsted . . . . .	Baltimore, Md.
Reid Hunt . . . . .	Brookline
Henry Jackson . . . . .	Boston
Abraham Jacobi . . . . .	New York, N. Y.
Elliott Proctor Joslin . . . . .	Boston
William Williams Keen . . . . .	Philadelphia, Pa.
Frank Burr Mallory . . . . .	Brookline
Samuel Jason Mixer . . . . .	Boston
Edward Hall Nichols . . . . .	Boston
Sir William Osler, Bart. . . . .	Oxford, Eng.
Theophil Mitchell Prudden . . . . .	New York, N. Y.
William Lambert Richardson . . . . .	Boston
Milton Joseph Rosenau . . . . .	Boston
Frederick Cheever Shattuck . . . . .	Boston
Theobald Smith . . . . .	Princeton, N. J.
Elmer Ernest Southard . . . . .	Boston
Richard Pearson Strong . . . . .	Boston
Ernest Edward Tyzzer . . . . .	Boston
Frederick Herman Verhoeff . . . . .	Boston
Henry Pickering Walcott . . . . .	Cambridge
John Collins Warren . . . . .	Boston
William Henry Welch . . . . .	Baltimore, Md.
Francis Henry Williams . . . . .	Boston
Simeon Burt Wolbach . . . . .	Boston
Horatio Curtis Wood . . . . .	Philadelphia, Pa.

CLASS III.—*Moral and Political Sciences*.—172.

SECTION I.—*Theology, Philosophy and Jurisprudence*.—47.

Thomas Willing Balch . . . . .	Philadelphia, Pa.
Simeon Eben Baldwin . . . . .	New Haven, Conn.
Willard Bartlett . . . . .	Brooklyn, N. Y.
Joseph Henry Beale . . . . .	Cambridge
Melville Madison Bigelow . . . . .	Cambridge
Charles Warren Clifford . . . . .	New Bedford
Edmund Burke Delabarre . . . . .	Providence, R. I.

James De Normandie . . . . .	Roxbury
Frederic Dodge . . . . .	Belmont
Edward Staples Drown . . . . .	Cambridge
William Harrison Dunbar . . . . .	Cambridge
Timothy Dwight . . . . .	New Haven, Conn.
William Herbert Perry Faunce . . . . .	Providence, R. I.
William Wallace Fenn . . . . .	Cambridge
Frederick Perry Fish . . . . .	Brookline
George Angier Gordon . . . . .	Boston
John Wilkes Hammond . . . . .	Cambridge
Alfred Hemenway . . . . .	Boston
Charles Evans Hughes . . . . .	New York, N. Y.
Frederick John Foakes Jackson . . . . .	New York, N. Y.
William Lawrence . . . . .	Boston
Arthur Lord . . . . .	Plymouth
William Caleb Loring . . . . .	Boston
Nathan Matthews . . . . .	Boston
Samuel Walker McCall . . . . .	Winchester
Edward Caldwell Moore . . . . .	Cambridge
James Madison Morton . . . . .	Fall River
George Herbert Palmer . . . . .	Cambridge
Charles Edwards Park . . . . .	Boston
Endicott Peabody . . . . .	Groton
Francis Greenwood Peabody . . . . .	Cambridge
George Wharton Pepper . . . . .	Philadelphia, Pa.
John Winthrop Platner . . . . .	Cambridge
Roscoe Pound . . . . .	Belmont
Elihu Root . . . . .	New York, N. Y.
James Hardy Ropes . . . . .	Cambridge
Arthur Prentice Rugg . . . . .	Worcester
Henry Newton Sheldon . . . . .	Boston
Moorfield Storey . . . . .	Boston
William Howard Taft . . . . .	New Haven, Conn.
William Jewett Tucker . . . . .	Hanover, N. H.
William Cushing Wait . . . . .	Medford
Williston Walker . . . . .	New Haven, Conn.
Eugene Wambaugh . . . . .	Cambridge
Edward Henry Warren . . . . .	Boston
Samuel Williston . . . . .	Belmont
Woodrow Wilson . . . . .	Washington, D. C.

CLASS III., SECTION II.—*Philology and Archæology*.—50.

Francis Greenleaf Allinson . . . . .	Providence, R. I.
William Rosenzweig Arnold . . . . .	Cambridge
Maurice Bloomfield . . . . .	Baltimore, Md.
Franz Boas . . . . .	New York, N. Y.
Charles Pickering Bowditch . . . . .	Jamaica Plain
Eugene Watson Burlingame . . . . .	Albany, N. Y.
Edward Capps . . . . .	Princeton, N. J.
Franklin Carter . . . . .	Williamstown
George Henry Chase . . . . .	Cambridge
Roland Burrage Dixon . . . . .	Cambridge
William Curtis Farabee . . . . .	Philadelphia, Pa.
Jesse Walter Fewkes . . . . .	Washington, D. C.
Jeremiah Denis Mathias Ford . . . . .	Cambridge
Basil Lanneau Gildersleeve . . . . .	Baltimore, Md.
Charles Hall Grandgent . . . . .	Cambridge
Louis Herbert Gray . . . . .	Boston
Charles Burton Gulick . . . . .	Cambridge
William Arthur Heidel . . . . .	Middletown, Conn.
George Lincoln Hendrickson . . . . .	New Haven, Conn.
Bert Hodge Hill . . . . .	Athens, Greece
Elijah Clarence Hills . . . . .	New York, N. Y.
Edward Washburn Hopkins . . . . .	New Haven, Conn.
Joseph Clark Hoppin . . . . .	Boston
Albert Andrew Howard . . . . .	Cambridge
William Guild Howard . . . . .	Cambridge
Aleš Hrdlička . . . . .	Washington, D. C.
Carl Newell Jackson . . . . .	Cambridge
Hans Carl Gunther von Jagemann . . . . .	Cambridge
James Richard Jewett . . . . .	Cambridge
Alfred Louis Kroeber . . . . .	Berkeley, Cal.
Kirsopp Lake . . . . .	Cambridge
Henry Roseman Lang . . . . .	New Haven, Conn.
Charles Rockwell Lanman . . . . .	Cambridge
David Gordon Lyon . . . . .	Cambridge
Clifford Herschel Moore . . . . .	Cambridge
George Foot Moore . . . . .	Cambridge
Hanns Oertel . . . . .	New Haven, Conn.
Bernadotte Perrin . . . . .	New Haven, Conn.
Edward Kennard Rand . . . . .	Cambridge

George Andrew Reisner . . . . .	Cambridge
Edward Robinson . . . . .	New York, N. Y.
Fred Norris Robinson . . . . .	Cambridge
Rudolph Schevill . . . . .	Berkeley, Cal.
Edward Stevens Sheldon . . . . .	Cambridge
Herbert Weir Smyth . . . . .	Cambridge
Franklin Bache Stephenson . . . . .	Claremont, Cal.
Charles Cutler Torrey . . . . .	New Haven, Conn.
Alfred Marston Tozzer . . . . .	Cambridge
Andrew Dickson White . . . . .	Ithaca, N. Y.
James Haughton Woods . . . . .	Cambridge

CLASS III., SECTION III.—*Political Economy and History.*—37.

Brooks Adams . . . . .	Quincy
George Burton Adams . . . . .	New Haven, Conn.
Charles McLean Andrews . . . . .	New Haven, Conn.
Charles Jesse Bullock . . . . .	Cambridge
Thomas Nixon Carver . . . . .	Cambridge
John Bates Clark . . . . .	New York, N. Y.
Archibald Cary Coolidge . . . . .	Boston
Richard Henry Dana . . . . .	Cambridge
Andrew McFarland Davis . . . . .	Cambridge
Davis Rich Dewey . . . . .	Cambridge
Ephraim Emerton . . . . .	Cambridge
Henry Walcott Farnam . . . . .	New Haven, Conn.
Irving Fisher . . . . .	New Haven, Conn.
Worthington Chauncey Ford . . . . .	Cambridge
Edwin Francis Gay . . . . .	Cambridge
Frank Johnson Goodnow . . . . .	Baltimore, Md.
Evarts Boutell Green . . . . .	Champaign, Ill.
Arthur Twining Hadley . . . . .	New Haven, Conn.
Albert Bushnell Hart . . . . .	Cambridge
Charles Homer Haskins . . . . .	Cambridge
Isaac Minis Hays . . . . .	Philadelphia, Pa.
Henry Cabot Lodge . . . . .	Nahant
Abbott Lawrence Lowell . . . . .	Cambridge
William MacDonald . . . . .	Berkeley, Cal.
Roger Bigelow Merriman . . . . .	Cambridge
Samuel Eliot Morison . . . . .	Boston
William Bennett Munro . . . . .	Cambridge

James Ford Rhodes . . . . .	Boston
William Milligan Sloane . . . . .	New York, N. Y.
Henry Morse Stephens . . . . .	Berkeley, Cal.
John Osborne Sumner . . . . .	Boston
Frank William Taussig . . . . .	Cambridge
William Roscoe Thayer . . . . .	Cambridge
Frederick Jackson Turner . . . . .	Cambridge
Thomas Franklin Waters . . . . .	Ipswich
George Grafton Wilson . . . . .	Cambridge
George Parker Winship . . . . .	Cambridge

CLASS III., SECTION IV.—*Literature and the Fine Arts.*—38.

George Pierce Baker . . . . .	Cambridge
Arlo Bates . . . . .	Boston
James Phinney Baxter . . . . .	Portland, Me.
William Sturgis Bigelow . . . . .	Boston
Le Baron Russell Briggs . . . . .	Cambridge
Charles Allerton Coolidge . . . . .	Boston
Ralph Adams Cram . . . . .	Boston
Samuel McChord Crothers . . . . .	Cambridge
Wilberforce Eames . . . . .	New York, N. Y.
Henry Herbert Edes . . . . .	Cambridge
Edward Waldo Emerson . . . . .	Concord
Arthur Fairbanks . . . . .	Cambridge
Arthur Foote . . . . .	Brookline
Edward Waldo Forbes . . . . .	Cambridge
Kuno Francke . . . . .	Gilbertsville, N. Y.
Daniel Chester French . . . . .	New York, N. Y.
Horace Howard Furness . . . . .	Philadelphia, Pa.
Robert Grant . . . . .	Boston
Morris Gray . . . . .	Boston
Chester Noyes Greenough . . . . .	Cambridge
Francis Barton Gummere . . . . .	Haverford, Pa.
Henry Lee Higginson . . . . .	Boston
James Kendall Hosmer . . . . .	Minneapolis, Minn.
Mark Antony DeWolfe Howe . . . . .	Boston
George Lyman Kittredge . . . . .	Cambridge
William Coolidge Lane . . . . .	Cambridge
Allan Marquand . . . . .	Princeton, N. J.
Albert Matthews . . . . .	Boston



Harold Murdock . . . . .	Brookline
William Allan Neilson . . . . .	Northampton
Herbert Putnam . . . . .	Washington, D. C.
Denman Waldo Ross . . . . .	Cambridge
John Singer Sargent . . . . .	London, Eng.
Ellery Sedgwick . . . . .	Boston
Richard Clipston Sturgis . . . . .	Boston
Barrett Wendell . . . . .	Boston
Owen Wister . . . . .	Philadelphia, Pa.
George Edward Woodberry . . . . .	Beverly

## FOREIGN HONORARY MEMBERS.—66.

(Number limited to seventy-five).

CLASS I.—*Mathematical and Physical Sciences.*—22.SECTION I.—*Mathematics and Astronomy.*—6.

Johann Oskar Backlund . . . . .	Petrograd
Felix Klein . . . . .	Göttingen
Tullio Levi-Civita . . . . .	Padua
Sir Joseph Norman Lockyer . . . . .	London
Charles Emile Picard . . . . .	Paris
Charles Jean de la Vallée Poussin . . . . .	Louvain

CLASS I., SECTION II.—*Physics.*—9.

Svante August Arrhenius . . . . .	Stockholm
Oliver Heaviside . . . . .	Torquay
Sir Joseph Larmor . . . . .	Cambridge
Hendrik Antoon Lorentz . . . . .	Leyden
Max Planck . . . . .	Berlin
Augusto Righi . . . . .	Bologna
Sir Ernest Rutherford . . . . .	Manchester
Rt. Hon. John William Strutt, Baron Rayleigh . . . . .	Witham
Sir Joseph John Thomson . . . . .	Cambridge

CLASS I., SECTION III.—*Chemistry.*—4.

Johann Friedrich Wilhelm, Adolf, Ritter von Baeyer . . . . .	Munich
Emil Fischer . . . . .	Berlin
Fritz Haber . . . . .	Berlin
Wilhelm Ostwald . . . . .	Leipsic

CLASS I.—SECTION IV.—*Technology and Engineering*.—3.

Heinrich Müller Breslau . . . . .	Berlin
Vsevolod Jevgenjevic Timonoff . . . . .	Petrograd
William Cawthorne Unwin . . . . .	London

CLASS II.—*Natural and Physiological Sciences*.—22.SECTION I.—*Geology, Mineralogy, and Physics of the Globe*.—8.

Frank Dawson Adams . . . . .	Montreal
Waldemar Christofer Brögger . . . . .	Christiania
Sir Archibald Geikie . . . . .	Haslemere, Surrey
Viktor Goldschmidt . . . . .	Heidelberg
Julius Hann . . . . .	Vienna
Albert Heim . . . . .	Zürich
Sir William Napier Shaw . . . . .	London
Johan Herman Lie Vogt . . . . .	Trondhjem

CLASS II., SECTION II.—*Botany*.—6.

John Briquet . . . . .	Geneva
Adolf Engler . . . . .	Berlin
Wilhelm Friedrich Philipp Pfeffer . . . . .	Leipsic
Hermann, Graf zu Solms-Laubach . . . . .	Strassburg
Ignatz Urban . . . . .	Berlin
Eugene Warming . . . . .	Copenhagen

CLASS II.—SECTION III.—*Zoölogy and Physiology*.—2.

Sir Edwin Ray Lankester . . . . .	London
Magnus Gustav Retzius . . . . .	Stockholm

CLASS II., SECTION IV.—*Medicine and Surgery*.—6.

Sir Thomas Barlow, Bart. . . . .	London
Emil von Behring . . . . .	Marburg
Angelo Celli . . . . .	Rome
Adam Politzer . . . . .	Vienna
Francis John Shepherd . . . . .	Montreal
Charles Scott Sherrington . . . . .	Oxford

CLASS III.—*Moral and Political Sciences.*—22.SECTION I.—*Theology, Philosophy and Jurisprudence.*—4.

Arthur James Balfour . . . . .	Prestonkirk
Heinrich Brunner . . . . .	Berlin
Albert Venn Dicey . . . . .	Oxford
Sir Frederick Pollock, Bart . . . . .	London

SECTION II.—*Philology and Archæology.*—8.

Friedrich Delitzsch . . . . .	Berlin
Hermann Diels . . . . .	Berlin
Wilhelm Dörpfeld . . . . .	Athens
Henry Jackson . . . . .	Cambridge
Hermann Georg Jacobi . . . . .	Bonn
Alfred Percival Maudslay . . . . .	Hereford
Ramon Menendez Pidal . . . . .	Madrid
Eduard Seler . . . . .	Berlin

SECTION III.—*Political Economy and History.*—5.

James Bryce, Viscount Bryce . . . . .	London
Adolf Harnack . . . . .	Berlin
Alfred Marshall . . . . .	Cambridge
John Morley, Viscount Morley of Blackburn . . . . .	London
Rt. Hon. Sir George Otto Trevelyan, Bart. . . . .	London

SECTION IV.—*Literature and the Fine Arts.*—5.

Georg Brandes . . . . .	Copenhagen
Thomas Hardy . . . . .	Dorchester
Jean Adrien Antoine Jules Jusserand . . . . .	Paris
Rudyard Kipling . . . . .	Burwash
Sir Sidney Lee . . . . .	London

# STATUTES AND STANDING VOTES

---

## STATUTES

*Adopted November 8, 1911: amended May 8, 1912, January 8, and May 14, 1913, April 14, 1915, April 12, 1916, April 10, 1918.*

---

### CHAPTER I

#### THE CORPORATE SEAL

ARTICLE 1. The Corporate Seal of the Academy shall be as here depicted:



ARTICLE 2. The Recording Secretary shall have the custody of the Corporate Seal.

*See Chap. v. art. 3; chap. vi. art. 2.*

## CHAPTER II

## FELLOWS AND FOREIGN HONORARY MEMBERS AND DUES

ARTICLE 1. The Academy consists of Fellows, who are either citizens or residents of the United States of America, and Foreign Honorary Members. They are arranged in three Classes, according to the Arts and Sciences in which they are severally proficient, and each Class is divided into four Sections, namely:

CLASS I. *The Mathematical and Physical Sciences*

Section 1. Mathematics and Astronomy

Section 2. Physics

Section 3. Chemistry

Section 4. Technology and Engineering

CLASS II. *The Natural and Physiological Sciences*

Section 1. Geology, Mineralogy, and Physics of the Globe

Section 2. Botany

Section 3. Zoölogy and Physiology

Section 4. Medicine and Surgery

CLASS III. *The Moral and Political Sciences*

Section 1. Theology, Philosophy, and Jurisprudence

Section 2. Philology and Archaeology

Section 3. Political Economy and History

Section 4. Literature and the Fine Arts

ARTICLE 2. The number of Fellows shall not exceed Six hundred, of whom not more than Four hundred shall be residents of Massachusetts, nor shall there be more than Two hundred in any one Class.

ARTICLE 3. The number of Foreign Honorary Members shall not exceed Seventy-five. They shall be chosen from among citizens of foreign countries most eminent for their discoveries and attainments in any of the Classes above enumerated. There shall not be more than Twenty-five in any one Class.

ARTICLE 4. If any person, after being notified of his election as Fellow or Resident Associate, shall neglect for six months to accept in writing, or, if a Fellow or resident within fifty miles of Boston shall neglect to pay his Admission Fee, his election shall be void; and if any Fellow resident within fifty miles of Boston or any Resident Associate shall neglect to pay his Annual Dues for six months after they are due, provided his attention shall have been called to this

Article of the Statutes in the meantime, he shall cease to be a Fellow or Resident Associate respectively; but the Council may suspend the provisions of this Article for a reasonable time.

With the previous consent of the Council, the Treasurer may dispense (*sub silentio*) with the payment of the Admission Fee or of the Annual Dues or both whenever he shall deem it advisable. In the case of officers of the Army or Navy who are out of the Commonwealth on duty, payment of the Annual Dues may be waived during such absence if continued during the whole financial year and if notification of such expected absence be sent to the Treasurer. Upon similar notification to the Treasurer, similar exemption may be accorded to Fellows or Resident Associates subject to Annual Dues, who may temporarily remove their residence for at least two years to a place more than fifty miles from Boston.

If any person elected a Foreign Honorary Member shall neglect for six months after being notified of his election to accept in writing, his election shall be void.

See Chap. vii. art. 2.

ARTICLE 5. Every Fellow resident within fifty miles of Boston hereafter elected shall pay an Admission Fee of Ten dollars.

Every Fellow resident within fifty miles of Boston shall, and others may, pay such Annual Dues, not exceeding Fifteen dollars, as shall be voted by the Academy at each Annual Meeting, when they shall become due; but any Fellow or Resident Associate shall be exempt from the annual payment if, at any time after his admission, he shall pay into the treasury Two hundred dollars in addition to his previous payments.

All Commutations of the Annual Dues shall be and remain permanently funded, the interest only to be used for current expenses.

Any Fellow not previously subject to Annual Dues who takes up his residence within fifty miles of Boston, shall pay to the Treasurer within three months thereafter Annual Dues for the current year, failing which his Fellowship shall cease; but the Council may suspend the provisions of this Article for a reasonable time.

Only Fellows who pay Annual Dues or have commuted them may hold office in the Academy or serve on the Standing Committees or vote at meetings.

ARTICLE 6. Fellows who pay or have commuted the Annual Dues and Foreign Honorary Members shall be entitled to receive gratis one copy of all Publications of the Academy issued after their election.

See Chap. x, art. 2.

ARTICLE 7. Diplomas signed by the President and the Vice-President of the Class to which the member belongs, and countersigned by the Secretaries, shall be given to Foreign Honorary Members and to Fellows on request.

ARTICLE 8. If, in the opinion of a majority of the entire Council, any Fellow or Foreign Honorary Member or Resident Associate shall have rendered himself unworthy of a place in the Academy, the Council shall recommend to the Academy the termination of his membership; and if three fourths of the Fellows present, out of a total attendance of not less than fifty at a Stated Meeting, or at a Special Meeting called for the purpose, shall adopt this recommendation, his name shall be stricken from the Roll.

*See Chap. iii.; chap. vi. art. 1; chap. ix. art. 1, 7; chap. x. art. 2.*

### CHAPTER III

#### ELECTION OF FELLOWS AND FOREIGN HONORARY MEMBERS

ARTICLE 1. Elections of Fellows and Foreign Honorary Members shall be made by the Council in April of each year, and announced at the Annual Meeting in May.

ARTICLE 2. Nominations to Fellowship or Foreign Honorary Membership in any Section must be signed by two Fellows of that Section or by three voting Fellows of any Sections; but in any one year no Fellow may nominate more than four persons. These nominations, with statements of qualifications and brief biographical data, shall be sent to the Corresponding Secretary.

All nominations thus received prior to February 15 shall be forthwith sent in printed form to every Fellow having the right to vote, with the names of the proposers in each case and a brief account of each nominee, and with the request that the list be returned before March 15, marked to indicate preferences of the voter in such manner as the Council may direct.

All the nominations, with any comments thereon and with the results of the preferential indications of the Fellows, received by March 15, shall be referred at once to the appropriate Class Committees, which shall report their decisions to the Council, which shall thereupon have power to elect.

Persons nominated in any year, but not elected, may be placed on the preferential ballot of the next year at the discretion of the Council,



but shall not further be continued on the list of nominees unless renominated.

Notice shall be sent to every Fellow having the right to vote, not later than the fifteenth of January, of each year, calling attention to the fact that the limit of time for sending nominations to the Corresponding Secretary will expire on the fifteenth of February.

*See Chap. ii.; chap. vi. art. 1; chap. ix. art. 1.*

## CHAPTER IV

### OFFICERS

ARTICLE 1. The Officers of the Academy shall be a President (who shall be Chairman of the Council), three Vice-Presidents (one from each Class), a Corresponding Secretary (who shall be Secretary of the Council), a Recording Secretary, a Treasurer, and a Librarian, all of whom shall be elected by ballot at the Annual Meeting, and shall hold their respective offices for one year, and until others are duly chosen and installed.

There shall be also twelve Councillors, one from each Section of each Class. At each Annual Meeting three Councillors, one from each Class, shall be elected by ballot to serve for the full term of four years and until others are duly chosen and installed. The same Fellow shall not be eligible for two successive terms.

The Councillors, with the other officers previously named, and the Chairman of the House Committee, *ex officio*, shall constitute the Council.

*See Chap. x. art. 1.*

ARTICLE 2. If any officer be unable, through death, absence, or disability, to fulfill the duties of his office, or if he shall resign, his place may be filled by the Council in its discretion for any part or the whole of the unexpired term.

ARTICLE 3. At the Stated Meeting in March, the President shall appoint a Nominating Committee of three Fellows having the right to vote, one from each Class. This Committee shall prepare a list of nominees for the several offices to be filled, and for the Standing Committees, and file it with the Recording Secretary not later than four weeks before the Annual Meeting.

*See Chap. vi. art. 2.*

ARTICLE 4. Independent nominations for any office, if signed by at least twenty Fellows having the right to vote, and received by the Recording Secretary not less than ten days before the Annual Meeting, shall be inserted in the call therefor, and shall be mailed to all the Fellows having the right to vote.

*See Chap. vi. art. 2.*

ARTICLE 5. The Recording Secretary shall prepare for use in voting at the Annual Meeting a ballot containing the names of all persons duly nominated for office.

## CHAPTER V

### THE PRESIDENT

ARTICLE 1. The President, or in his absence the senior Vice-President present (seniority to be determined by length of continuous fellowship in the Academy), shall preside at all meetings of the Academy. In the absence of all these officers, a Chairman of the meeting shall be chosen by ballot.

ARTICLE 2. Unless otherwise ordered, all Committees which are not elected by ballot shall be appointed by the presiding officer.

ARTICLE 3. Any deed or writing to which the Corporate Seal is to be affixed, except leases of real estate, shall be executed in the name of the Academy by the President or, in the event of his death, absence, or inability, by one of the Vice-Presidents, when thereto duly authorized.

*See Chap. ii. art. 7; chap. iv. art. 1, 3; chap. vi. art. 2; chap. vii. art. 1; chap. ix. art. 6; chap. x. art. 1; 2; chap. xi. art. 1.*

## CHAPTER VI

### THE SECRETARIES

ARTICLE 1. The Corresponding Secretary shall conduct the correspondence of the Academy and of the Council, recording or making an entry of all letters written in its name, and preserving for the files all official papers which may be received. At each meeting of the Council he shall present the communications addressed to the Academy which have been received since the previous meeting, and at the next meeting of the Academy he shall present such as the Council may determine.

He shall notify all persons who may be elected Fellows or Foreign

Honorary Members, or Resident Associates, send to each a copy of the Statutes, and on their acceptance issue the proper Diploma. He shall also notify all meetings of the Council; and in case of the death, absence, or inability of the Recording Secretary he shall notify all meetings of the Academy.

Under the direction of the Council, he shall keep a List of the Fellows, Foreign Honorary Members, and Resident Associates, arranged in their several Classes and Sections. It shall be printed annually and issued as of the first day of July.

*See Chap. ii. art. 7; chap. iii. art. 2, 3; chap. iv. art. 1; chap. ix. art. 6; chap. x. art. 1; chap. xi. art. 1.*

ARTICLE 2. The Recording Secretary shall have the custody of the Charter, Corporate Seal, Archives, Statute-Book, Journals, and all literary papers belonging to the Academy.

Fellows or Resident Associates borrowing such papers or documents shall receipt for them to their custodian.

The Recording Secretary shall attend the meetings of the Academy and keep a faithful record of the proceedings with the names of the Fellows and Resident Associates present; and after each meeting is duly opened, he shall read the record of the preceding meeting.

He shall notify the meetings of the Academy to each Fellow and Resident Associate by mail at least seven days beforehand, and in his discretion may also cause the meetings to be advertised; he shall apprise Officers and Committees of their election or appointment, and inform the Treasurer of appropriations of money voted by the Academy.

After all elections, he shall insert in the Records the names of the Fellows by whom the successful nominees were proposed.

He shall send the Report of the Nominating Committee in print to every Fellow having the right to vote at least three weeks before the Annual Meeting.

*See Chap. iv. art. 3.*

In the absence of the President and of the Vice-Presidents he shall, if present, call the meeting to order, and preside until a Chairman is chosen.

*See Chap. i.; chap. ii. art. 7; chap. iv. art. 3, 4, 5; chap. ix. art. 6; chap. x. art. 1, 2; chap. xi. art. 1, 3.*

ARTICLE 3. The Secretaries, with the Chairman of the Committee of Publication, shall have authority to publish such of the records of the meetings of the Academy as may seem to them likely to promote its interests.

## CHAPTER VII

## THE TREASURER AND THE TREASURY

ARTICLE 1. The Treasurer shall collect all money due or payable to the Academy, and all gifts and bequests made to it. He shall pay all bills due by the Academy, when approved by the proper officers, except those of the Treasurer's office, which may be paid without such approval; in the name of the Academy he shall sign all leases of real estate; and, with the written consent of a member of the Committee on Finance, he shall make all transfers of stocks, bonds, and other securities belonging to the Academy, all of which shall be in his official custody.

He shall keep a faithful account of all receipts and expenditures, submit his accounts annually to the Auditing Committee, and render them at the expiration of his term of office, or whenever required to do so by the Academy or the Council.

He shall keep separate accounts of the income of the Rumford Fund, and of all other special Funds, and of the appropriation thereof, and render them annually.

His accounts shall always be open to the inspection of the Council.

ARTICLE 2. He shall report annually to the Council at its March meeting on the expected income of the various Funds and from all other sources during the ensuing financial year. He shall also report the names of all Fellows and Resident Associates who may be then delinquent in the payment of their Annual Dues.

ARTICLE 3. He shall give such security for the trust reposed in him as the Academy may require.

ARTICLE 4. With the approval of a majority of the Committee on Finance, he may appoint an Assistant Treasurer to perform his duties, for whose acts, as such assistant, he shall be responsible; or, with like approval and responsibility, he may employ any Trust Company doing business in Boston as his agent for the same purpose, the compensation of such Assistant Treasurer or agent to be fixed by the Committee on Finance and paid from the funds of the Academy.

ARTICLE 5. At the Annual Meeting he shall report in print all his official doings for the preceding year, stating the amount and condition

of all the property of the Academy entrusted to him, and the character of the investments.

ARTICLE 6. The Financial Year of the Academy shall begin with the first day of April.

ARTICLE 7. No person or committee shall incur any debt or liability in the name of the Academy, unless in accordance with a previous vote and appropriation therefor by the Academy or the Council, or sell or otherwise dispose of any property of the Academy, except cash or invested funds, without the previous consent and approval of the Council.

*See Chap. ii. art. 4, 5; chap. vi. art. 2; chap. ix. art. 6; chap. x. art. 1, 2, 3; chap. xi. art. 1.*

## CHAPTER VIII

### THE LIBRARIAN AND THE LIBRARY

ARTICLE 1. The Librarian shall have charge of the printed books, keep a correct catalogue thereof, and provide for their delivery from the Library.

At the Annual Meeting, as Chairman of the Committee on the Library, he shall make a Report on its condition.

ARTICLE 2. In conjunction with the Committee on the Library he shall have authority to expend such sums as may be appropriated by the Academy for the purchase of books, periodicals, etc., and for defraying other necessary expenses connected with the Library.

ARTICLE 3. All books procured from the income of the Rumford Fund or of other special Funds shall contain a book-plate expressing the fact.

ARTICLE 4. Books taken from the Library shall be receipted for to the Librarian or his assistant.

ARTICLE 5. Books shall be returned in good order, regard being had to necessary wear with good usage. If any book shall be lost or injured, the Fellow or Resident Associate to whom it stands charged shall replace it by a new volume or by a new set, if it belongs to a set, or pay the current price thereof to the Librarian, whereupon the

remainder of the set, if any, shall be delivered to the Fellow or Resident Associate so paying, unless such remainder be valuable by reason of association.

ARTICLE 6. All books shall be returned to the Library for examination at least one week before the Annual Meeting.

ARTICLE 7. The Librarian shall have the custody of the Publications of the Academy. With the advice and consent of the President, he may effect exchanges with other associations.

*See Chap. ii. art. 6; chap. x. art. 1, 2.*

## CHAPTER IX

### THE COUNCIL

ARTICLE 1. The Council shall exercise a discreet supervision over all nominations and elections to membership, and in general supervise all the affairs of the Academy not explicitly reserved to the Academy as a whole or entrusted by it or by the Statutes to standing or special committees.

It shall consider all nominations duly sent to it by any Class Committee, and present to the Academy for action such of these nominations as it may approve by a majority vote of the members present at a meeting, of whom not less than seven shall have voted in the affirmative.

With the consent of the Fellow interested, it shall have power to make transfers between the several Sections of the same Class, reporting its action to the Academy.

*See Chap. iii. art. 2, 3; chap. x, art. 1.*

ARTICLE 2. Seven members shall constitute a quorum.

ARTICLE 3. It shall establish rules and regulations for the transaction of its business, and provide all printed and engraved blanks and books of record.

ARTICLE 4. It shall act upon all resignations of officers, and all resignations and forfeitures of Fellowship or Resident Associateship; and cause the Statutes to be faithfully executed.

It shall appoint all agents and subordinates not otherwise provided for by the Statutes, prescribe their duties, and fix their compensation.

They shall hold their respective positions during the pleasure of the Council.

ARTICLE 5. It may appoint, for terms not exceeding one year, and prescribe the functions of, such committees of its number, or of the Fellows of the Academy, as it may deem expedient, to facilitate the administration of the affairs of the Academy or to promote its interests.

ARTICLE 6. At its March meeting it shall receive reports from the President, the Secretaries, the Treasurer, and the Standing Committees, on the appropriations severally needed for the ensuing financial year. At the same meeting the Treasurer shall report on the expected income of the various Funds and from all other sources during the same year.

A report from the Council shall be submitted to the Academy, for action, at the March meeting, recommending the appropriation which in the opinion of the Council should be made.

On the recommendation of the Council, special appropriations may be made at any Stated Meeting of the Academy, or at a Special Meeting called for the purpose.

*See Chap. x. art. 3.*

ARTICLE 7. After the death of a Fellow or Foreign Honorary Member, it shall appoint a member of the Academy to prepare a biographical notice for publication in the Proceedings.

ARTICLE 8. It shall report at every meeting of the Academy such business as it may deem advisable to present.

*See Chap. ii. art. 4, 5, 8; chap. iv, art. 1, 2; chap. vi. art. 1; chap. vii, art. 1; chap. xi. art. 1, 4.*

## CHAPTER X

### STANDING COMMITTEES

ARTICLE 1. The Class Committee of each Class shall consist of the Vice-President, who shall be chairman, and the four Councillors of the Class, together with such other officer or officers annually elected as may belong to the Class. It shall consider nominations to Fellowship in its own Class, and report in writing to the Council such as may receive at a Class Committee Meeting a majority of the votes cast, provided at least three shall have been in the affirmative.

*See Chap. iii. art. 2.*

ARTICLE 2. At the Annual Meeting the following Standing Committees shall be elected by ballot to serve for the ensuing year:

(i) *The Committee on Finance*, to consist of three Fellows, who, through the Treasurer, shall have full control and management of the funds and trusts of the Academy, with the power of investing the funds and of changing the investments thereof in their discretion.

*See Chap. iv. art. 3; chap. vii. art. 1, 4; chap. ix. art. 6.*

(ii) *The Rumford Committee*, to consist of seven Fellows, who shall report to the Academy on all applications and claims for the Rumford Premium. It alone shall authorize the purchase of books publications and apparatus at the charge of the income from the Rumford Fund, and generally shall see to the proper execution of the trust.

*See Chap. iv. art. 3; chap. ix. art. 6.*

(iii) *The Cyrus Moors Warren Committee*, to consist of seven Fellows, who shall consider all applications for appropriations from the income of the Cyrus Moors Warren Fund, and generally shall see to the proper execution of the trust.

*See Chap. iv. art. 3; chap. ix. art. 6.*

(iv) *The Committee of Publication*, to consist of three Fellows, one from each Class, to whom all communications submitted to the Academy for publication shall be referred, and to whom the printing of the Proceedings and the Memoirs shall be entrusted.

It shall fix the price at which the Publications shall be sold; but Fellows may be supplied at half price with volumes which may be needed to complete their sets, but which they are not entitled to receive gratis.

Two hundred extra copies of each paper accepted for publication in the Proceedings, or the Memoirs shall be placed at the disposal of the author without charge.

*See Chap. iv. art. 3; chap. vi. art. 1, 3; chap. ix. art. 6.*

(v) *The Committee on the Library*, to consist of the Librarian, *ex officio*, as Chairman, and three other Fellows, one from each Class, who shall examine the Library and make an annual report on its condition and management.

*See Chap. iv. art. 3; chap. viii. art. 1, 2; chap. ix. art. 6.*



(vi) *The House Committee*, to consist of three Fellows, who shall have charge of all expenses connected with the House, including the general expenses of the Academy not specifically assigned to the care of other Committees or Officers.

*See* Chap. iv. art. 1, 3; chap. ix. art. 6.

(vii) *The Committee on Meetings*, to consist of the President, the Recording Secretary, and three other Fellows, who shall have charge of plans for meetings of the Academy.

*See* Chap. iv. art. 3; chap. ix. art. 6.

(viii) *The Auditing Committee*, to consist of two Fellows, who shall audit the accounts of the Treasurer, with power to employ an expert and to approve his bill.

*See* Chap. iv. art. 3; chap. vii. art. 1; chap. ix. art. 6.

ARTICLE 3. The Standing Committees shall report annually to the Council in March on the appropriations severally needed for the ensuing financial year; and all bills incurred on account of these Committees, within the limits of the several appropriations made by the Academy, shall be approved by their respective Chairmen.

In the absence of the Chairman of any Committee, bills may be approved by any member of the Committee whom he shall designate for the purpose.

*See* Chap. vii. art. 1, 7; chap. ix. art. 6.

## CHAPTER XI

### MEETINGS, COMMUNICATIONS, AND AMENDMENTS

ARTICLE 1. There shall be annually eight Stated Meetings of the Academy, namely, on the second Wednesday of October, November, December, January, February, March, April and May. Only at these meetings, or at adjournments thereof regularly notified, or at Special Meetings called for the purpose, shall appropriations of money be made or amendments of the Statutes or Standing Votes be effected.

The Stated Meeting in May shall be the Annual Meeting of the Corporation.

Special Meetings shall be called by either of the Secretaries at the request of the President, of a Vice-President, of the Council, or of ten

Fellows having the right to vote; and notifications thereof shall state the purpose for which the meeting is called.

A meeting for receiving and discussing literary or scientific communications may be held on the fourth Wednesday of each month, excepting July, August, and September; but no business shall be transacted at said meetings.

ARTICLE 2. Twenty Fellows having the right to vote shall constitute a quorum for the transaction of business at Stated or Special Meetings. Fifteen Fellows shall be sufficient to constitute a meeting for literary or scientific communications and discussions.

ARTICLE 3. Upon the request of the presiding officer or the Recording Secretary, any motion or resolution offered at any meeting shall be submitted in writing.

ARTICLE 4. No report of any paper presented at a meeting of the Academy shall be published by any Fellow or Resident Associate without the consent of the author; and no report shall in any case be published by any Fellow or Resident Associate in a newspaper as an account of the proceedings of the Academy without the previous consent and approval of the Council. The Council, in its discretion, by a duly recorded vote, may delegate its authority in this regard to one or more of its members.

ARTICLE 5. No Fellow or Resident Associate shall introduce a guest at any meeting of the Academy until after the business has been transacted, and especially until after the result of the balloting upon nominations has been declared.

ARTICLE 6. The Academy shall not express its judgment on literary or scientific memoirs or performances submitted to it, or included in its Publications.

ARTICLE 7. All proposed Amendments of the Statutes shall be referred to a committee, and on its report, at a subsequent Stated Meeting or at a Special Meeting called for the purpose, two thirds of the ballot cast, and not less than twenty, must be affirmative to effect enactment.

ARTICLE 8. Standing Votes may be passed, amended, or rescinded at a Stated Meeting, or at a Special Meeting called for the purpose, by a vote of two thirds of the members present. They may be suspended by a unanimous vote.

*See Chap. ii. art. 5, 8; chap. iii.; chap. iv. art. 3, 4, 5; chap. v. art. 1; chap. vi. art. 1, 2; chap. ix. art. 8.*

## STANDING VOTES

1. Communications of which notice has been given to either of the Secretaries shall take precedence of those not so notified.

2. Fellows or Resident Associates may take from the Library six volumes at any one time, and may retain them for three months, and no longer. Upon special application, and for adequate reasons assigned, the Librarian may permit a larger number of volumes, not exceeding twelve, to be drawn from the Library for a limited period.

3. Works published in numbers, when unbound, shall not be taken from the Hall of the Academy without the leave of the Librarian.

4. There may be chosen by the Academy, under such rules as the Council may determine, one hundred Resident Associates. Not more than forty Resident Associates shall be chosen in any one Class.

Resident Associates shall be entitled to the same privileges as Fellows, in the use of the Academy building, may attend meetings and present papers, but they shall not have the right to vote. They shall pay no Admission Fee, and their Annual Dues shall be the same as those of Fellows residing within fifty miles of Boston.

The Council and Committees of the Academy may ask one or more Resident Associates to act with them in an advisory or assistant capacity.

5. Communications offered for publication in the Proceedings or Memoirs of the Academy shall not be accepted for publication before the author shall have informed the Committee on Meetings of his readiness, either himself or through some agent, to use such time as the Committee may assign him at such meeting as may be convenient both to him and to the Committee, for the purpose of presenting to the Academy a general statement of the nature and significance of the results contained in his communication.

## RUMFORD PREMIUM

In conformity with the terms of the gift of Sir Benjamin Thompson, Count Rumford, of a certain Fund to the American Academy of Arts and Sciences, and with a decree of the Supreme Judicial Court of Massachusetts for carrying into effect the general charitable intent and purpose of Count Rumford, as expressed in his letter of gift, the Academy is empowered to make from the income of the Rumford Fund, as

it now exists, at any Annual Meeting, an award of a gold and a silver medal, being together of the intrinsic value of three hundred dollars, as a Premium to the author of any important discovery or useful improvement in light or heat, which shall have been made and published by printing, or in any way made known to the public, in any part of the continent of America, or any of the American Islands; preference always being given to such discoveries as, in the opinion of the Academy, shall tend most to promote the good of mankind; and, if the Academy sees fit, to add to such medals, as a further Premium for such discovery and improvement, a sum of money not exceeding three hundred dollars.

# INDEX.

- Adams, Brooks, elected Fellow, 773.  
 Adams, C. F., Notice of, 776.  
 Adams, F. D., accepts Foreign Honorary Membership, 753.  
 Adams, G. B., elected Fellow, 756, accepts Fellowship, 757.  
 Adams, Henry, death of, 764.  
 Agassiz, G. R., Report of the House Committee, 770.  
 Algae, The, of Bermuda, 1.  
 Allen, Mildred. *See* Webster, A. G., and Allen, Mildred.  
 Amory (Francis) Fund, 766.  
 Andrews, C. McL., elected Fellow, 756, accepts Fellowship, 757.  
 Animals, Racing, The Speeds, Powers and Fatigues of, 755.  
 Ants, The Australian, of the Ponerine Tribe Cerapachyini, 213.  
 Archibald, R. C., accepts Fellowship, 753.  
 Arizona, The Genus *Fraxinus* in, 197.  
 Australian Ants, The, of the Ponerine Tribe Cerapachyini, 213.  
 Balch, T. W., elected Fellow, 756, accepts Fellowship, 757.  
 Baker, Sir Benjamin, Notice of, 781.  
 Ballistic Experiments by means of the Electrometer, 757.  
 Barlow, Thomas, elected Foreign Honorary Member, 756, accepts Foreign Honorary Membership, 758.  
 Bartlett, Willard, elected Fellow, 756, accepts Fellowship, 757.  
 Behrend, B. A., accepts Fellowship, 753.  
 Bermuda, The Algae of, 1.  
 Bermuda Biological Station for Research, Contributions from, 1.  
 Biographical Notices, List of, 775.  
 Birkhoff, G. D., On Stability in Dynamics, 774.  
 Boston, Post-glacial History of, 439, 754, 755.  
 Bradford, Gamaliel, elected Fellow, 774.  
 Bridgman, P. W., Thermo-electromotive Force, Peltier Heat, and Thomson Heat under Pressure, 267.  
 Brunetière, Ferdinand, Notice of, 782.  
 Brush, C. F., accepts Fellowship, 753.  
 Burlingame, E. W., accepts Fellowship, 753.  
 Cabot, A. T., Notice of, 793.  
 Capps, Edward, elected Fellow, 773.  
 Cerapachyini, The Australian Ants of the Ponerine Tribe, 213.  
 Chinese Paper Money, Ancient, as Described in a Chinese Work on Numismatics, 465.  
 Choate, J. H., death of, 753.  
 Christian, H. A., the String Galvanometer in the Study of Heart Disease, 757.  
 Clark, W. B., death of, 753.  
 Clifford, C. W., elected Fellow, 756, accepts Fellowship, 757.  
 Collins, F. S., and Hervey, A. B., The Algae of Bermuda, 1.  
 Committees, Standing, elected, 771.  
 Comstock, C. B., Notice of, 799.  
 Coolidge, C. A., elected Fellow, 774.  
 Coral-reef Problem, New Coast Survey Charts of the Philippine Islands and their bearing on the, 763.  
 Council, Report of, 764.  
 Crafts, J. M., death of, 753, Notice of, 801.  
 Cram, R. A., accepts Fellowship, 753.  
 Cross, C. R., Report of Rumford Committee, 767.  
 Cryptogamic Laboratory of Harvard University, Contribution from, 695.  
 Davis, A. M., Ancient Chinese Paper

- Money as Described in a Chinese Work on Numismatics, 465.
- Davis, W. M., New Coast Survey Charts of the Philippine Islands, and their bearing on the Coral-reef Problem, 763.
- De Amicis, Edmondo, Notice of, 804.
- Delabarre, E. B., elected Fellow, 773.
- Drew, E. B. Drew, resigns Fellowship, 764.
- Dyadics, The, which occur in a Point Space of Three Dimensions, 387.
- Dynamics, On Stability in, 774.
- Edes, Henry H., Report of Treasurer, 765.
- Electrometer, Ballistic Experiments by means of the, 757.
- Emerson, E. W., accepts Fellowship, 753.
- Ernst, H. C., An Old and New Microscope, 757.
- Etiology, Studies on the, of Rocky Mountain Spotted Fever, 757.
- Eupatorinae, 774.
- Faunce, W. H. P., elected Fellow, 773.
- Faxon, C. E., death of, 757.
- Fellows deceased, (12) —
- Henry Adams, 764.
- J. H. Choate, 753.
- W. B. Clarke, 753.
- J. M. Crafts, 753.
- C. E. Faxon, 757.
- W. DeW. Hyde, 753.
- M. P. Knowlton, 764.
- G. V. Leverett, 754.
- B. L. Pratt, 753.
- H. L. Warren, 753.
- J. W. White, 753.
- P. S. Yendell, 757.
- Fellows elected, (36) —
- Brooks Adams, 773.
- G. B. Adams, 756.
- C. McL. Andrews, 756.
- T. W. Balch, 756.
- Willard Bartlett, 756.
- Gamaliel Bradford, 774.
- Edward Capps, 773.
- C. W. Clifford, 756.
- C. A. Coolidge, 774.
- E. B. Delabarre, 773.
- W. H. P. Faunce, 773.
- E. W. Forbes, 774.
- W. E. Ford, 755.
- W. C. Gorgas, 755.
- Morris Gray, 774.
- E. B. Greene, 756.
- R. B. Greenough, 755.
- I. M. Hays, 774.
- G. L. Hendrickson, 773.
- E. C. Hills, 773.
- C. E. Hughes, 756.
- A. M. Huntington, 774.
- Henry Jackson, 756.
- Grinnell Jones, 755.
- Irving Langmuir, 755.
- William MacDonald, 756.
- J. M. Morton, 756.
- Harold Murdock, 756.
- T. N. Page, 774.
- W. H. Page, 774.
- Leighton Parks, 773.
- Endicott Peabody, 773.
- F. G. Peabody, 773.
- H. B. Phillips, 773.
- Rudolph Schevill, 773.
- D. L. Webster, 773.
- Fellows elected, declining Fellowship, E. D. White, 753.
- Fellows, List of, 879.
- Fellows resigning Fellowship, J. H. Wright, 757.
- O. K. O. Folin, 758.
- E. B. Drew, 764.
- Fisher, W. J., a Table of the Legendre Functions of the Second Kind  $Q_1(x)$  and  $Q'_1(x)$ , 755.
- Folin, O. K. O., resigns Fellowship, 758.
- Forbes, E. W., elected Fellow, 774.
- Ford, W. E., elected Fellow, 755, accepts Fellowship, 757.
- Foreign Honorary Members deceased, (2) —
- G. C. C. Maspero, 754.
- Pasquale Villari, 757.
- Foreign Honorary Members elected, (4) —
- Thomas Barlow, 756.
- W. N. Shaw, 756.
- F. J. Shepherd, 756.
- C. S. Sherrington, 756.
- Foreign Honorary Members, List of, 894.
- Fraxinus, The Genus in New Mexico and Arizona, 197.
- Furness, H. H., accepts Fellowship, 753.
- Galvanometer, The String, in the Study of Heart Disease, 757.

- General Fund, 765; Appropriations from the Income of, 759.
- Geological Observations along the West Coast of South America, 759.
- Glacial, post-, History of Boston, 439, 754, 755.
- Goodwin, W. W., Notice of, 805.
- Gorgas, W. C., elected Fellow, 755, accepts Fellowship, 764.
- Gray, Morris, elected Fellow, 774.
- Gregory, H. E., accepts Fellowship, 753.
- Greene, E. B., elected Fellow, 756, accepts Fellowship, 757.
- Greenough, C. N., accepts Fellowship, 753.
- Greenough, R. B., elected Fellow, 755, accepts Fellowship, 757.
- Gummere, F. B., accepts Fellowship, 753.
- Hall, Edward H., Notice of, 816.
- Harvard University. *See* Cryptogamic Laboratory.
- Hays, I. M., elected Fellow, 774.
- Heart Disease, The String Galvanometer in the Study of, 757.
- Hendrickson, G. L., elected Fellow, 773.
- Hervey, A. B. *See* Collins, F. S. and Hervey, A. B.
- Hills, E. C., elected Fellow, 773.
- Hoppin, J. C., accepts Fellowship, 753.
- House Committee, Report of, 768.
- House Expenses, Appropriations for, 759.
- Howard, W. G., accepts Fellowship, 753.
- Howe, W. W., Notice of, 818.
- Hughes, C. E., elected Fellow, 756, accepts Fellowship, 757.
- Hull, G. F., accepts Fellowship, 753.
- Huntington, A. M., elected Fellow, 774.
- Huntington, E. V., Report of Publishing Committee, 767.
- Hyde, W. DeW., death of, 753.
- Hyperspace, Rotations in, 649, 764.
- Jackson, F. J. Foakes, accepts Fellowship, 753.
- Jackson, Henry, elected Fellow, 756, accepts Fellowship, 757.
- Jeffrey, E. C., On the Origin of Rubber, 759.
- Johnson, C. W., accepts Fellowship, 753.
- Jones, Grinnell, elected Fellow, 755, accepts Fellowship, 757.
- Kansas Academy of Science, Semi-centennial anniversary of, 758.
- Kennelly, A. E., The Speeds, Powers, and Fatigue of Racing Animals, 755.
- Kinnicutt, L. P., Notice of, 821.
- Knowlton, M. P., death of, 764.
- Koch, Robert, Notice of, 825.
- Laboulbeniales, Extra-American Dipterophilous, 695, 764.
- Laboulbeniales, New, from Chile and New Zealand, 764.
- Langley, S. P., Notice of, 828.
- Langmuir, Irving, elected Fellow, 755, accepts Fellowship, 757.
- Legendre Functions of the Second Kind  $Q_1(x)$  and  $Q'_1(x)$ , a Table of the, 755.
- Leverett, G. V., death of, 754.
- Levi-Civita, Tullio, accepts Foreign Honorary Membership, 753.
- Library, Appropriations for, 759.
- Library Committee, Report of, 767.
- Lindgren, Waldemar, Some Geological Observations along the West Coast of South America, 759.
- Lodge, H. C., War Legislation, 754.
- Loomis, F. B., accepts Fellowship, 753.
- Lord, Arthur, accepts Fellowship, 753.
- Lounsbury, T. R., Notice of, 831.
- Lull, R. S., accepts Fellowship, 753.
- Lyman, Theodore, awarded Rumford Premium, 771.
- MacDonald, William, elected Fellow, 756, accepts Fellowship, 760.
- Marquand, Allan, accepts Fellowship, 753.
- Maspero, G. C. C., death of, 754.
- McAdie, Alexander, accepts Fellowship, 753.
- Microscope, An Old and New, 757.
- Miller, W. J., accepts Fellowship, 753.
- Minot, C. S., Notice of, 840.
- Molecular Structure, Graphic Formulas of Organic Chemistry: To what extent may they be considered true pictures of, 774.

- Money, Ancient Chinese Paper, as Described in a Chinese Work on Numismatics, 465.
- Moore, C. H., The Decay of Nationalism under the Roman Empire, 763.
- Moore, C. L. E., Rotations in Hyperspace, 649, 764.
- Moore, C. L. E., and Phillips, H. B., The Dyadics which occur in a Point Space of Three Dimensions, 387, 755.
- Moore, F. J., Graphic Formulas of Organic Chemistry: To what extent may they be considered true pictures of Molecular Structure?, 774.
- Moore, G. F., The Properties of Numbers and the Doctrine of Ideas, 755.
- Morley, Frank, accepts Fellowship, 753.
- Morton, J. M., elected Fellow, 756, accepts Fellowship, 757.
- Murdock, Harold, elected Fellow, 756, accepts Fellowship, 757.
- Nationalism, The Decay of, under the Roman Empire, 763.
- New Mexico, The Genus *Fraxinus* in, 197.
- Nominating Committee, 759.
- Numbers, The Properties of, and the Doctrine of Ideas, 755.
- Numismatics, Ancient Chinese Paper Money as Described in a Chinese Work on Numismatics, 465.
- Officers elected, 771; List of, 877.
- Packard, A. S., Notice of, 848.
- Page, T. N., elected Fellow, 774.
- Page, W. H., elected Fellow, 774.
- Park, C. E., accepts Fellowship, 753.
- Parks, Leighton, elected Fellow, 773.
- Peabody, Endicott, elected Fellow, 773.
- Peabody, F. G., elected Fellow, 773.
- Peirce, B. O., Notice of, 850.
- Peltier Heat, Thermo-electromotive Force, and Thomson Heat under Pressure, 267.
- Philippine Islands, New Coast Survey Charts of the, and their bearing on the Coral-reef Problem, 763.
- Phillips, H. B., elected Fellow, 773.
- Phillips, H. B. See Moore, C. L. E. and Phillips, H. B.
- Pidal, R. M., accepts Foreign Honorary Membership, 753.
- Pirsson, L. V., accepts Fellowship, 753.
- Ponerine Tribe *Cerapachyini*, The Australian Ants of the, 213.
- Pratt, B. L., death of, 753.
- Pressure, Thermo-electromotive Force Peltier Heat, and Thomson Heat under, 267.
- Psychoanalytic Movement, A General View of the, 753.
- Publication Committee, Report of, 767.
- Publication Fund, 766; Appropriation from the Income of, 759.
- Putnam, J. J., A General View of the Psychoanalytic Movement, 753.
- Raymond, P. E., accepts Fellowship, 753.
- Recklinghausen, F. D. von, Notice of, 872.
- Records of Meetings, 753.
- Rehder, Alfred, The Genus *Fraxinus* in New Mexico and Arizona, 197.
- Rice, W. N., accepts Fellowship, 753.
- Robinson, B. L., I. Diagnoses and Notes relating to tropical American Eupatorieae. II. A descriptive Revision of the Columbian Eupatoriums. III. Keyed Recensions of the Eupatoriums of Venezuela and Ecuador, 774.
- Rotations in Hyperspace, 649, 764.
- Royce (Josiah) Memorial Fund, letter signed by President, 763.
- Rubber, On the Origin of, 759.
- Rumford Committee, Report of, 767.
- Rumford Fund, 765; Appropriations from the Income of, 759; Papers published by aid of, 267.
- Rumford Premium, 911; award of, 771.
- Russell, I. C., Notice of, 855.
- Saint Gaudens, Augustus, Notice of, 859.
- Schevill, Rudolph, elected Fellow, 773.
- Sellers, William, Notice of, 861.
- Shaw, W. N., elected Foreign Honorary Member, 756, accepts Foreign Honorary Membership, 758.



- Shepherd, F. J., elected Foreign Honorary Member, 756, accepts Foreign Honorary Membership, 757.
- Sherrington, C. S., elected Foreign Honorary Member, 756, accepts Foreign Honorary Membership, 758.
- Shimer, H. W., Post-glacial History of Boston, 439, 754, 755.
- Slocum, Frederick, accepts Fellowship, 753.
- Standing Committees elected, 771; List of, 877.
- Standing Votes, 911.
- Statutes, 897; Amendment of, 763.
- Statutes, Committee appointed on Amendment of, 755; report of, 760.
- Strobel, E. H., Notice of, 863.
- Sturgis, R. C., accepts Fellowship, 753.
- Sumner, W. G., Notice of, 866.
- Talbot, H. P., The Nitrogen Question and the War, 774; Report of the C. M. Warren Committee, 767.
- Taylor, F. W., Notice of, 870.
- Thaxter, Roland, Extra-American Dipterophilous Laboulbeniales, 695-764. New Laboulbeniales from Chile and New Zealand, 764.
- Thermo-electromotive Force, Peltier Heat, and Thomson Heat under Pressure, 267.
- Thomson Heat, Thermo-electromotive Force, Peltier Heat, and, under Pressure, 267.
- Treasurer, Report of, 765.
- Union List of Periodicals, assistance to, 759.
- University of California, fiftieth anniversary of, 754.
- United States Fuel Administration, Request sent to, 758.
- Villari, Pasquale, death of, 757.
- War Legislation, 754.
- Warren (C. M.) Committee, Report of, 767.
- Warren (C. M.) Fund, 766; Appropriations from the Income of, 759.
- Warren, H. L., death of, 753.
- Watson, J. B., accepts Fellowship, 753.
- Webster, A. G., and Allen, Mildred, Ballistic Experiments by means of the Electrometer, 757.
- Webster, A. G., Report of the Library Committee, 767.
- Webster, D. L., elected Fellow, 773.
- Wendell, O. C., Notice of, 875.
- Wheeler, W. M., The Australian Ants of the Ponerine Tribe Cerapachyini, 213.
- White, E. D., declines Fellowship, 753.
- White, J. W., death of, 753.
- Wolbach, S. B., Studies on the Etiology of Rocky Mountain Spotted Fever, 757.
- Wright, J. H., resigns Fellowship, 757.
- Yendell, P. S., death of, 757.
- Zeleny, John, accepts Fellowship, 753.



## VOLUME 52.

1. THAXTER, ROLAND.—New or Critical Species of Chitonomyces and Rickia. pp. 1-54. June, 1916. 70c.
2. BRIDGMAN, P. W.—The Velocity of Polymorphic Changes between Solids. pp. 55-88. July, 1916. 50c.
3. BRIDGMAN, P. W.—Polymorphism at High Pressures. pp. 89-187. July, 1916. \$1.00.
4. PIERCE, GEORGE W.—Theoretical Investigation of the Radiation Characteristics of an Antenna. pp. 189-252. October, 1916. \$1.00.
5. WALTON, A. C.—The 'Refractive Body' and the 'Mitochondria' of *Ascaris canis* Werner. pp. 253-266. 2 pls. October, 1916. 40c.
6. WILSON, EDWIN B., AND MOORE, C. L. E.—Differential Geometry of Two Dimensional Surfaces in Hyperspace. pp. 267-368. November, 1916. \$1.50.
7. HITCHCOCK, FRANK LAUREN.—A Classification of Quadratic Vectors. pp. 369-454. January, 1917. \$1.25.
8. WHEELER, WILLIAM MORTON.—The Mountain Ants of western North America. pp. 455-569. January, 1917. \$1.25.
9. BRIDGMAN, P. W.—The Electrical Resistance of Metals under Pressure. pp. 571-646. February, 1917. 90c.
10. THAXTER, ROLAND.—New Laboulbeniales, chiefly Dipterophilous American Species. pp. 647-721. May, 1917. \$1.00.
11. CROZIER, W. J.—On the Pigmentation of a Polyclad. pp. 723-730. 1 colored plate. May, 1917. 40c.
12. TRUEBLOOD, H. M.—The Joule-Thompson Effect in Superheated Steam: I. Experimental Study of Heat-leakage. pp. 731-804. June, 1917. \$1.00.
13. Records of Meetings; Officers and Committees; List of Fellows and Foreign Honorary Members; Statutes and Standing Votes. etc. October, 1917. \$1.00.

(Continued on page 2 of cover.)

# PUBLICATIONS

OF THE

## AMERICAN ACADEMY OF ARTS AND SCIENCES.

MEMOIRS. OLD SERIES, Vols. 1-4; NEW SERIES, Vols. 1-13.  
16 volumes, \$10 each. Half volumes, \$5 each. Discount to  
booksellers 25%; to Fellows 50%, or for whole sets 60%.

- Vol. 11.** PART 1. Centennial Celebration. 1880. pp. 1-104. 1882. \$2.00.  
PART 2. No. 1. Agassiz, A.—The Tortugas and Florida Reefs. pp. 105-134. 12 pls. June, 1885. (Author's copies, June, 1883.) \$3.00.  
PART 3. Nos. 2-3. Searle, A.—The Apparent Position of the Zodiacal Light. pp. 135-157 and Chandler, S. C.—On the Square Bar Micrometer. pp. 158-178. October, 1885. \$1.00.  
PART 4. No. 4. Pickering, E. C.—Stellar Photography. pp. 179-226. 2 pls. March, 1886. \$1.00.  
PART 4. No. 5. Rogers, W. A., and Winlock, Anna.—A Catalogue of 130 Polar Stars for the Epoch of 1875.0, resulting from the available Observations made between 1860 and 1885, and reduced to the System of the Catalogue of Publication XIV of the Astronomische Gesellschaft. pp. 227-300. June, 1886. 75c.  
PART 5. No. 6. Langley, S. P., Young, C. A., and Pickering, E. C.—Pritchard's Wedge Photometer. pp. 301-324. November, 1886. 25c.  
PART 6. No. 7. Wyman, M.—Memoir of Daniel Treadwell. pp. 325-523. October, 1887. \$2.00.  
**Vol. 12.** 1. Sawyer, E. F.—Catalogue of the Magnitudes of Southern Stars from 0° to -30° Declination, to the Magnitude 7.0 inclusive. pp. 1-100. May, 1892. \$1.50.  
2. Rowland, H. A.—On a Table of Standard Wave Lengths of the Spectral Lines. pp. 101-186. December, 1896. \$2.00.  
3. Thaxter, R.—Contribution towards a Monograph of the Laboulbeniaceæ. pp. 187-430. 26 pls. December, 1896. \$6.00.  
4. Lowell, P.—New observations of the Planet Mercury. pp. 431-466. 8 pls. June, 1898. \$1.25.  
5. Sedgwick, W. T., and Winslow, C. E. A.—(I.) Experiments on the Effect of Freezing and other low Temperatures upon the Viability of the Bacillus of Typhoid Fever, with Considerations regarding Ice as a Vehicle of Infectious Disease. (II.) Statistical Studies on the Seasonal Prevalence of Typhoid Fever in various Countries and its Relation to Seasonal Temperature. pp. 467-579. 8 pls. August, 1902. \$2.50.  
**Vol. 13.** 1. Curtiss, D. R.—Binary Families in a Triply connected Region with Especial Reference to Hypergeometric Families. pp. 1-60. January, 1904. \$1.00.  
2. Tonks, O. S.—Bryos: his Characteristics. pp. 61-119. 2 pls. November, 1904. \$1.50.  
3. Lyman, T.—The Spectrum of Hydrogen in the Region of Extremely Short Wave-Length. pp. 121-148. pls. iii-viii. February, 1906. 75c.  
4. Pickering, W. H.—Lunar and Hawaiian Physical Features Compared. pp. 149-179. pls. ix-xxiv. November, 1906. \$1.10.  
5. Trowbridge, J.—High Electro-motive Force. pp. 181-215. pls. xxv-xxvii. May, 1907. 75c.  
6. Thaxter, R.—Contribution toward a Monograph of the Laboulbeniaceæ. Part II. pp. 217-469. pls. xxviii-lxxi. June, 1908. \$7.00.  
**Vol. 14.** 1. Lowell, Percival—The Origin of the Planets. pp. 1-16. pls. i-iv. June, 1913. 60c.

PROCEEDINGS. Vols. 1-53, \$5 each. Discount to booksellers  
25%; to Fellows 50%, or for whole sets 60%.

The individual articles may be obtained separately. A price list of recent articles is printed on the inside pages of the cover of the Proceeding.

Complete Works of Count Rumford. 4 vols., \$5.00 each.  
Memoir of Sir Benjamin Thompson, Count Rumford, with Notices of  
his Daughter. By George E. Ellis. \$5.00.  
Complete sets of the Life and Works of Rumford. 5 vols., \$25.00;  
to Fellows, \$5.00.

For sale at the Library of THE AMERICAN ACADEMY OF ARTS AND  
SCIENCES, 28 Newbury Street, Boston, Massachusetts.

